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VII. Dropsy of the Cavities of the Chest.

143. Defin.—*Sense of oppression in the chest ; urgent dyspnœa on exercise or in the horizontal posture ; livid lips ; œdematous countenance and extremities ; weak, small, and irregular pulse ; disturbed sleep, with sudden startings, &c.*

144. As dropsy of the pericardium is so very generally connected with more or less effusion into the cavities of the pleuræ, that we seldom find the one without the other, although in varying grades and relative proportions ; and as the former, as well as the latter, is a very frequent consequence of structural change in the substance of the lungs, or in the pleuræ, or in the heart itself and its valves ; I shall, therefore, describe them as species of the same genus. The difficulty, also, of determining whether the fluid is chiefly, or altogether, in the pericardium, or in the pleuræ, even in cases where it is limited to one only, is an additional reason for considering hydro-pericardium and hydrothorax in connection with each other. It is principally, however, when the effusion is symptomatic of structural lesions of the thoracic viscera, or of a more generally morbid state of the frame, that we find them co-existent, and without any remarkable preponderance in favour of either the one or the other. But when effusion is the more immediate result, or the sequela, of inflammatory action, or of a state of organic action closely allied to inflammation, in either the pericardium or pleuræ, it is generally limited accordingly, and it often accumulates to a very great extent.

i. Dropsy of the Pericardium.

Syn. *Hydrops Pericardii, Hydro-pericardii, Hydro-pericardia, Hydro-pericardium* (from ὕδωρ, water, and περίκαρδιον, pericardium) of Authors ; *Herzbeutelwassersucht*, Germ.; *Hydro-péricarde*, Fr.; *Dropsy of the Heart*, Eng.

145. Defin.—*Oppressive dyspnœa, with a sense of weight and tremor referred to the region of the heart ; anxiety ; inability to retain the supine posture ; weak, irregular, or intermitting pulse ; livid and œdematous countenance ; distension of the jugular veins ; leipothymia ; fulness of the epigastrium, and of the anterior intercostal spaces ; percussion emitting a dull sound, and auscultation furnishing a faint and diffused sound, over all the cardiac region.*

146. *A.* It is obvious that pathologists ought to agree as to the least quantity of fluid in the pericardium that should be considered to constitute dropsy of its cavity. Vesalius states, that it always contains a small quantity of water in health, and that he had observed it in criminals who had been quartered while alive. Lower entertains a similar opinion. F. Hoffmann, however, comes to a different conclusion ; he having observed no fluid in the pericardium of healthy animals : whilst Littre found some in the animals on which he experimented. Haller believes that this cavity contains a fluid destined to facilitate the functions of the heart, but gives no opinion as to its quantity, in health. He remarks, that it may be greatly increased in various diseases, and that it may be absorbed (*Elementa Physiol. &c.* 4to. vol. i. p. 292.). Senac infers that, in the natural state, the pericardium contains no fluid ; he having found none in several cases in which this membrane and the heart were both healthy. Corvisart, Testa, J. P. Frank, Kreysig, Bertin, Louis, Elliotson, Hope, &c. appear to have adopted the opinion of Haller, in considering that this cavity always contains a little fluid ; but they differ in some respects as to the amount which should be viewed as constituting dropsy of it. M. Corvisart believes that, when it reaches six or seven ounces, hydro-pericardium exists. This inference has been adopted by Pinel, Bertin, Elliotson, and Hope, who think that this quantity will give rise to symptoms indicating, although with great uncertainty, the seat of effusion ; whilst Laennec concludes that double or triple this quantity may not admit of a correct diagnosis. Much, however, will depend upon the rapidity of its collection, and the nature of the pathological states either causing it, or connected with it. A larger quantity than that now named, has sometimes accumulated without having induced such symptoms as could enable the practitioner to decide as to the exact nature and seat of the disease, particularly when chronic affections of the lungs or heart have accompanied it.

147. From one to five or six ounces of fluid are sometimes found in the pericardium, in several maladies either of adjoining or of remote organs, especially in persons who have died of phthisis. This collection, obviously greater — at least, the higher amount — than exists in health, seldom gives rise to specific symptoms, although the larger quantity may occasion much disorder. It may, indeed, form very shortly before death, and may merely be contingent on the changes immediately preceding dissolution, particularly when the malady destroys life by asphyxia, or when congestion of the lungs and disorder of the respiratory actions have been present for a short time previously ; and its amount may even be increased subsequently to the fatal issue. When fluid collects

in the pericardium to an extent obviously constituting dropsy, and calculated, from its influence on the functions of the heart and lungs, to be the chief lesion by which life may be abridged, it will give rise to a certain train of symptoms, generally indicative of the presence of water within the chest, although not always of its precise situation. The quantity that may admit of detection, in this situation, cannot be stated absolutely. The existence of eight or ten ounces, or even of a smaller quantity, may be ascertained, in some instances; whilst in others, nearly double the amount may not be recognised with precision, as FRANK and LAENNEC have truly contended.

148. *B.* It is important to know *the pathological states on which effusion of fluid in this situation depends, and the conditions of life and of organisation with which it is connected.* These points have been but imperfectly ascertained; but, from some attention I have paid to the subject, I believe that they may be referred to the following: — 1st. The effusion may be one of the more immediate results of inflammatory action (see PERICARDIUM — *Inflammation of*), in some instances; and, in others, a remote sequela of this disease. — *a.* In this case it generally forms more or less rapidly; may not be attended by any or much effusion or inflammatory appearances in the pleural cavities, although it very frequently is so associated; and it may accumulate to a great extent. The instances referred to by CORVISART, FRANK, and others, in which several pounds of fluid were found in the pericardium, seem to have been of this kind. The nature of the disease, in this variety, may generally be inferred with some accuracy, when the effused fluid amounts to more than six or eight ounces, — from antecedent symptoms of inflammatory or acute disease referrible to the region of the heart, either previously to, or attending, the effusion; from urgent anxiety at the præcordia, with continued jactitation; from a dull sound being emitted, by percussion, to a greater or less extent over the cardiac region, and a faint and diffused sound being furnished by auscultation; from the motions of the heart being perceptible beyond their ordinary limits, the impulse being undulatory, unequal, and felt at various points; and, when the accumulation is great, from a marked fulness in the epigastric region, occasionally with a vibratory pulsation, and with fulness of the anterior intercostal spaces of the left side, or with some degree of external œdema in this situation. In some instances of this form of the disease, these symptoms suddenly supervene, and are attended by orthopnœa; small, frequent, irregular, intermitting, and weak pulse; syncope or leipothymia, followed by slight fits of obscure palpitations, distension of the jugular veins, bloated livid countenance, and cold extremities. — *b. On dissection* in these cases, marks of inflammation are observed in the pericardium, with thickening and sometimes with lymph adhering to its surface, or floating in the fluid in filaments or in the state of albuminous flocculi. Occasionally the fluid is serous and turbid, resembling whey; or albuminous, or sero-puriform, or nearly purulent, or even sanguineous. In these, the rapid effusion of fluid appears to be owing to the sudden loss of the tone of the extreme capillaries and exhalants; the increased and morbid action of the vessels supplying them still continuing, sometimes connected with an unhealthy state of the system. — *c.* This form of pericardiac dropsy may exist either *alone,* or it may be *complicated* with, or consequent upon, pleuritis, or pneumonia, or acute bronchitis; or may be connected with the rheumatic or gouty diathesis, and be even a metastasis of these maladies.

149. 2d. Fluid may be effused in the pericardium, as in other serous cavites, by a slower process than that generally accompanying or following inflammatory action; and be attended by a very different state of this membrane. — *a.* In this class of cases, the effusion commonly depends upon impeded or disordered circulation through the heart or lungs, arising from a variety of organic changes of a chronic kind in these organs; or upon structural lesions of the pleura; or upon disease seated in the mediastinum, or in the large vessels. It is, in such instances, often connected with a leucophlegmatic, lymphatic, or dropsical diathesis, and debilitated frame. The fluid collects slowly, is accompanied by no local or constitutional symptoms of an inflammatory kind; and the attendant disorder is aggravated by an anti-inflammatory treatment. When it reaches a very considerable amount, the patient feels a weight in the cardiac region, with pain in the back and loins: and if he be emaciated or thin, the impulse given to the fluid by the dilatations of the heart may be felt and seen between the third and fifth ribs. The sensation of the organ floating in a fluid, said, by some writers, to be felt by the patient, has not been confirmed by my observation; but the feeling communicated to the hand of the physician, by the stethoscope, is frequently that of an impulse transmitted through a fluid, and an undulation is sometimes felt. In addition to these, and the preceding symptoms (§ 148.), there are often a dry cough, leipothymia, sometimes followed by palpitation, which is occasionally violent; inability to use any exertion; a necessity of sitting up, and of leaning forward; a cold, leucophlegmatic, or œdematous countenance, with lividity of the lips; cold and anasarcous extremities; lowness of spirits; emaciation, particularly of the trunk; scanty, red, and laterititious urine. Inability to lie in the supine posture is often an early sign; although the patient may lie on either side. But this, like several of the other symptoms, is uncertain; for some persons in health are incapable of retaining the supine posture even for a short time. The above phenomena are also inconstant, owing to the nature of the primary or co-existent lesions; and, when present, they are often obscured by the more prominent symptoms directly depending upon these lesions. — *b. On dissection,* the pericardium is not reddened or injected; it is somewhat paler, or whiter, than natural — occasionally of even a satiny whiteness; but it is generally opaque, slightly thickened, and sometimes softened, and appearing as having been macerated in the liquid it contained, — an appearance which has been doubted by LAENNEC. The *fluid* itself is usually colourless and limpid; sometimes of a citron tint, or yellow; and occasionally turbid, of a brownish, or of a greenish hue. — *c.* This form of the disease is seldom or ever met with unconnected with the lesions already alluded to; and is frequently

merely a part of a more general effusion of fluid, either into other serous cavities — particularly the pleural — or into the cellular tissue. J. P. FRANK could adduce only four cases from authors and his own experience, in which hydro-pericardium was not accompanied by some other change in the membrane or related organs; and even one or more of these might have been thus associated. Whilst this variety of the disease is *chronic*, and manifestly *symptomatic*, the preceding is *acute*, at least in its early stages, but sometimes assuming a more chronic and passive character; and, although it cannot be said strictly to be idiopathic or primary, it may be viewed as a consequence of a morbid state of vascular action not altogether identical with the sthenic inflammation which takes place in a healthy constitution. I have seen several instances of it arising from metastasis of rheumatism to the pericardium, occurring in weak and unhealthy constitutions.

150. 3d. Fluid may be effused in the pericardium in a third form, but seldom to the extent of constituting the principal morbid change. It has been shown that the lesion giving rise to the *first* variety is chiefly seated in the pericardium, and is nearly allied to, although it is probably seldom identical with, the true inflammatory action, or phlogosis, of the internal surface of that membrane; and that the *second* variety is caused by impeded circulation from organic change of the more immediately related organs, the effusion taking place in a similar manner to other symptomatic dropsies.—*a*. But the variety now about to be described, is an attendant upon a very different and a more universal state of disease; usually comes on not long before death; is a consequence of the generally perverted or alienated conditions of life, occasioning deficient vital cohesion of this membrane, and lost tone of the extreme vessels and exhaling pores, in which changes the rest of the organisation more or less participates; and is frequently unattended by any prominent symptom.—*b*. It supervenes on the latter stages of some malignant or adynamic diseases, in the course of which the blood becomes contaminated by morbid matters, either absorbed from without, or generated in some part of the body. Thus, I have observed it in several cases of phlebitis, particularly in uterine phlebitis; in the true malignant puerperal fever; and in fatal cases of erysipelas, small-pox, and scarlatina. It likewise takes place after wounds from dissection, and in carcinomatous and some other maladies. In all these, the pericardium only participates more or less in a similar alteration taking place in other shut cavities, most frequently in the pleuræ, excepting in adynamic puerperal diseases, when the peritoneum is also the seat of effusion to a much greater extent. — *c*. On *dissection*, the tissues are found soft, flabby, easily torn, and of a dirty or dusky hue. In these morbid states, the heart and pericardium participate, but they are not inflamed. The blood is often dark, fluid or semifluid, or grumous; and the liquid effused is turbid, greenish brown, or brown, or sero-sanguineous, and seldom amounting to more than ten or twelve ounces.—*d*. In this variety of hydro-pericardium, the characters of the fluid, the state of the textures, and the manifestations of life, indicate that the vital cohesion, or the organic contractility, and tone, of the membrane, and particularly of the extreme exhaling vessels or pores, are lost; and that the more watery parts of the blood, with a portion of the smaller globules, and even of the colouring particles, are thereby enabled to pass through them. It is evidently one of the ultimate lesions produced by contamination of the circulating fluids, and of the soft solids, in the manner pointed out in the articles BLOOD (§ 132—152.), and DISEASE (§ 148.). (See also HEART, and PERICARDIUM.)

151. *C.* DIAGNOSIS.—The difficulty of distinguising dropsy of the pericardium from that of the pleuræ has been insisted on by every writer since MORGAGNI. This has arisen from the circumstances already alluded to; from the very frequent co-existence of effusion into both these situations; and from the extent to which the symptoms accompanying organic lesions of the lungs, heart, and large vessels, producing the effusion into the pericardium, obscure the phenomena caused by it. No opinion, therefore, can be formed from any one symptom; and even that founded on a careful investigation of the history of the case, and of the *tout ensemble* of the phenomena, must still be viewed with some distrust. Early disturbance of the actions of the heart, and irregularity of the pulse; a lesser degree of dyspnœa relatively to such disturbance (MORGAGNI); the sounds heard on percussion and auscultation; the sensations depending on the motions and impulse of the heart, felt either by the patient or by the examiner, as that of the heart swimming in water (REIMANN and SAXONIA), and that of an impulse transmitted through a fluid; a fluctuating tremor (SENAC) and fulness either felt or seen at the epigastrium and anterior parts of the left intercostal spaces; a sense of weight and oppression in the cardiac region (LANCISI); absence of the fluctuation upon concussion or succussion of the trunk observed in hydrothorax (MORGAGNI); an irregularity in the situation of the heart's pulse, it being felt, at different times, in different parts of an extensive circle; œdema, or fulness towards the left side of the chest (CORVISART); coldness and œdema of the feet, legs, and hands; and leipothymia and palpitations; have been severally insisted on, and are the signs most to be depended upon; but there is not one of them that is constantly present, or, when present, that is caused by hydro-pericardium only. When effusion is limited to the left pleural cavity, as in the cases recorded by Mr. HENDERSON and M. DESAULT, and in which paracentesis was performed, a correct diagnosis is most difficult.

152. *D.* CAUSES.—These have been noticed in the description of the different states of the disease, and are nearly the same as those giving rise to other forms of dropsy. The connection of hydro-pericardium with debility, especially of the vascular system, and with a softened and flabby state of the substance of the heart, is deserving of attention. I have seen it thus related, both in children and grown-up persons of all ages, living in cold, low, and damp places, or cellars, especially after the eruptive fevers and rheumatism; and, according to TESTA, it is most frequent in females, particularly after delivery (§ 150.). In the third form which I have described, it very often supervenes in the

last stages of the more fatal diseases of the puerperal state.

153. *E.* The PROGNOSIS must necessarily be very unfavourable. Yet it should not preclude the having recourse to a protracted treatment, as life may be prolonged by judicious measures perseveringly employed, and a cure may eventually be effected, particularly when the effusion has been consequent upon inflammatory action, or the metastasis of rheumatism to the pericardium. The prognosis should entirely depend upon the form of the disease: it is unfavourable in the first variety I have described; much more so in the second; and the worst in the third.

154. *F.* TREATMENT.—(*a*) The means of cure in the 1st *variety* should be the same as are advised for inflammation of the pericardium, as long as signs of phlogistic action exist. But as soon as this lapses into a passive or an asthenic form, no benefit will result from lowering measures. Energetic derivation and external counter-irritation ought then to be directed. In most of such cases, however, unless the vital energies are very greatly reduced, calomel with camphor, and small doses of opium, or the sublimate with sarsaparilla,—the former carried the length of salivation, the latter of affecting the gums,—and a seton, or issue, or open blister, kept discharging over the margin of the left false ribs, will be productive of benefit. Whilst these are being employed, the constitutional powers should be supported; and, if they be much depressed, medicines of a tonic and astringent operation, with light nutritious diet, ought to be prescribed. Care must, however, be taken that inflammatory disorder is subdued in the lungs and pleura, when the effusion into the pericardium is thus complicated, before tonics or stimulants of a heating kind are administered. In such cases, the infusion of roses, with small doses of the sulphate of zinc, and sulphuric acid, with digitalis, will be found the most appropriate. But the main reliance must be placed upon external derivation. When the effusion has been consequent upon the metastasis of rheumatism, or of gout, active counter-irritation, the combination of colchicum with camphor or ammonia or with both, the alkaline carbonates or subcarbonates in full doses, and tonic purgatives, with the rest of treatment already recommended, may be employed.

155. (*b*) In the 2d *variety*, or that depending upon organic change in the heart, lungs, or large vessels, but little benefit will be derived from diuretics or, perhaps, from any treatment that can be adopted. I believe that lowering measures, too generally resorted to in cases of this description, will only hasten a fatal issue. Much more advantage will be obtained from means which increase the secretions and excretions — the assimilating and eliminating processes. Very small and frequent doses of blue pill, with a tonic extract, or the soap and opium pill; bitter or tonic infusions and decoctions, with an alkaline subcarbonate, hyoscyamus, and extract of taraxacum; an issue in the side, kept freely and long discharging; and due attention to the developement of vital power, by appropriate medicines, diet, and regimen, and a pure air, without heating or exciting the vascular system; are the most to be relied upon. The bowels and biliary secretions ought to be moderately acted on by medicines of a tonic, deobstruent, and laxative operation, which will promote vital power, while they exert a derivative action on these viscera. With this view, diuretics of an analogous kind may be added to the other remedies. The treatment of the 3d *variety* must entirely depend upon the nature of the primary disease, of which it is merely a remote consequence. The indications of cure, in these maladies, and a review of the most efficient measures, will be found in the articles BLOOD (§ 156. *et seq.*), and DEBILITY (§ 37, 38.).

156. (*c*) *Paracentesis pericardii.* — The proposal of tapping the pericardium, made long since by RIOLAN and SENAC, and sometimes practised, is deserving of notice. It was attempted in the case published by Mr. HENDERSON, and in one of a similar kind by M. DESAULT; the existence of hydro-pericardium having been inferred in both. But it was found, in both instances, that the fluid had been effused into the left pleura, from partial pleuritis, and that the pericardium adhered to the heart. An opening, however, has been made into the pericardium by LARREY, RICHERAND, and ROMERO. The last named physician punctured the pericardium, and drew off the accumulated fluid, in three cases; and in two with success. (See *Dict. des Sciences Méd.* t. xl. p. 371., and *Medico-Chirurgical Review*, vol. i. p. 477.) He made an incision between the fifth and sixth ribs (but between the fourth and fifth in a short person), and carried it through the pleura. He then introduced his finger, and, having thereby ascertained the presence of the fluid in the pericardium, he made an opening into it with small crooked scissors; through this the fluid escaped into the left pleural cavity, whence it was discharged by placing the patient in a proper position. By this procedure, if the fluid be in this latter cavity, instead of the pericardium, as in the cases of HENDERSON and DESAULT, the first opening gives it exit, and nothing further is requisite. The plan of Dr. ROMERO possesses undoubted advantages, even in this last respect; and he has accordingly practised it in five cases of hydrothorax, and in three successfully.

157. It is evident that this operation can be productive of benefit only in those cases that belong to the *first* variety, or that consequent on inflammatory action, when effusion frequently is limited to the pericardiac cavity. In states of the disease depending upon organic lesions of the adjoining viscera and parts, when the effusion is rarely or never so limited, no advantage can be hoped from an operation. In itself, paracentesis, whether restricted to a simple opening into the thorax, or extended to the pericardium in the manner practised by Dr. ROMERO, is attended by no greater risk than when it is performed on the abdomen. The chief dangers from it are entirely the same as those pointed out above (§ 105.), when discussing the propriety of it in this latter situation. The fears of danger from the introduction of the external air causing the collapse of the lungs, is not well founded. If the wound be carefully closed after a deep expiration, the resiliency of this organ, and the absorption of the air, will overcome the difficulty. The mischief is occasioned in a different manner, — by the

action of the air upon the inflamed or otherwise diseased membrane; and hence the impropriety (and probable cause of failure in several cases) of leaving a canula in the opening, or of introducing a tent sponge. I state this from having seen this practice adopted in cases of paracentesis, and carefully observed the antecedent and consequent states of diseased action. I would, therefore, submit, when the last resource of an operation is attempted, that it should be performed with the utmost precautions against the introduction of the external air; and that the opening should be carefully and accurately closed, and kept closed, instantly upon the discharge of the fluid; and that, instead of preserving an opening for its continued flow, the operation should be repeated when it becomes really necessary. (See PERICARDIUM.)

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ii. DROPSY OF THE PLEURAL CAVITIES. — SYN. *Hydrothorax* (ὕδωρ, water; ϑώραξ, the chest), *Hydrops Saccorum Pleuræ*, Auct. var.; *Dropsy of the Pleuræ*; *Hydropisie de la Poitrine*, Fr.; *Brustwassersucht*, Germ.; *Idropisia di Petto*, Ital.; *Water in the Chest.*

158. DEFIN.—*Dyspnœa and oppression in the chest, increased by the horizontal posture and exercise, with œdema commencing in the eyelids and ancles; startings from sleep; the sounds on percussion being dull, and the respiratory murmur not heard on auscultation.*

159. Hydrothorax has been divided into *idiopathic* or primary, and *symptomatic*. It is very rarely primary, as M. LAENNEC has observed — that is, without pre-existing disease of the pleuræ, lungs, heart, or large vessels. But it is often *consecutive* of increased vascular action, or inflammatory irritation of the pleuræ, without any lesion of other parts, particularly when it follows the eruptive fevers; and it may be a termination of pleuritis, especially in the lymphatic or phlegmatic temperament, and in the cachectic habit of body. Its *symptomatic* or *complicated* states are the most common. As the *consecutive* hydrothorax, in all its forms, is generally acute or sub-acute, or possesses more or less of the sthenic characters, it will be considered as such; whilst the *symptomatic* will be viewed as a passive, chronic, or asthenic disease.

160. *A.* ACUTE AND SUB-ACUTE HYDROTHORAX; *Inflammatory Hydrothorax, Hydro-pleuritis*, or *Hydro-pleurisy*, of RAYER. — That this form of pleural dropsy consists of increased exhalation from the pleuræ, depending upon increased vascular action and determination to this surface, will be admitted; but that it is identical with inflammation, of an acute and healthy kind, may be questioned. The symptoms, local and constitutional, in hydrothorax of the most acute kind, and in pleuritis — either the pulmonary or costal — are certainly not identical, particularly in respect of severity. Hence, although much similarity exists, as far as mere vascular injection, or determination of the circulation, is concerned; and although pleurisy may terminate in, or give rise to, serous effusion in many instances; yet the kind of organic action affecting the pleuræ, and the attendant constitutional disturbance, are not the same in both. The difference has already been alluded to (§ 18.); but I may here add, that the formative processes — the kind and grade of organic vascular action — characterising pleuritis, are not observed either in the local lesions or in the constitutional affection of acute hydrothorax, unless when the effusion supervenes on external injuries and inflammation, or is an earlier attendant on a modified condition of such disease. The consecutive states of acute pleural dropsy, as it may be studied after scarlatina, either during life, or in the morbid appearances, illustrate this view, and prove, that there is, as respects both the conditions of the effused fluid, and the changes in the pleuræ, a difference in the kind of organic action whence they have proceeded, from true inflammation, and that such difference is evidently connected with constitutional causes. It is very common to observe that, when an attack or attacks of either pneumonia or pleuritis have been removed by treatment, a slight exposure to their exciting causes, or irregularities on the part of the patient, before the diseased vessels have regained their healthy tone and action, will give rise to a less acute, or a smothering, state of disease, either attended by, or quickly terminating in, effusion; the reduced powers of the constitution, the lost tone of the exhaling pores, and the general or local excited action, favouring this particular malady — this morbidly increased serous exhalation — in preference to any other. In this way acute or sub-acute hydrothorax supervenes on a state of the frame which has not recovered from previous disease — more particularly from eruptive fevers — or which has been impaired by age, excesses, or irregularities; the powers of life, and the organic action thereon depending, being insufficient to develope sthenic or phlogistic inflammation. The *inferences*, then, from the causes, accession, phenomena, and concomitant changes observed in the *acute* or *sub-*

acute disease, are, that it is not identical with healthy inflammation, although frequently so nearly allied to it as to appear either as a termination, or as a lower grade, or as a modification of it; and that it is often connected with, even although it may not be dependent upon, the nature of the preceding malady, in which the secretions and excretions have been interrupted, and not sufficiently restored.

161. That inflammation of the bronchi, or of the substance of the lungs, will sometimes be propagated to the pleuræ, generally in consequence of constitutional fault or injudicious management, and give rise to effusion into their cavities, is well known; that inflammation of the surface of the liver, or of the peritoneum, or of both, will occasionally extend to the pleuræ, particularly in debilitated or cachectic subjects, and, having reached this situation, terminate in effusion, I have often remarked; and that the state of vascular action, whose similarity or connection with true inflammation has been noticed, but whose identity with it has been denied, will occur in the pleuræ in various states of sequence and of complication, has been a matter of daily observation, and may be readily illustrated from the pages of Bonet, Morgagni, Stoll, Lepois, Lieutaud, Leroux, and many other of the writers referred to. In some localities, also, and during certain epidemics, it has been remarked that peripneumony has evinced a remarkable tendency to terminate in this manner. Dr. Romero states, that, on the coast of Andalusia, hydrothorax and hydro-pericardium are endemic, owing chiefly to the prevalence of hot and humid winds, and sudden atmospheric vicissitudes, particularly among those who are ill fed, or live on unwholesome food, and are given to intoxication or irregularities; and M. Pariset observed this form of hydrothorax prevalent in Geneva, in 1803, — the symptoms being so slight that the patient's appetite and ability of attending to his affairs continued until the pleural collection induced violent oppression. He states, that the number who died among the French conscripts was very considerable, — the effused fluid being limpid and inodorous, and the pleura grayish and thickened, and the lung compressed, or condensed.

162. The *morbid appearances* in the acute form of hydrothorax, whether it has been connected with inflammation, or active congestion of the substance of the lungs; or has proceeded from a modified form of pleuritis, either occurring primarily, or consecutively on an eruptive fever, or after the suppression of some chronic disease of the skin, or of an accustomed discharge; are usually the following: — The *fluid* presents every shade of colour already remarked (§ 11.) — is sometimes turbid, muddy, reddish, sanguineous, whey-like, or sero-purulent; but more frequently transparent, of a citron tint, with filaments or numerous albuminous flocculi floating in it. The *membrane* is internally reddened, or injected, thickened and somewhat softened, and occasionally covered by an albuminous, granulated, or tuberculous exudation. The *lungs* are generally compressed, condensed hepatised, or tuberculated; and present appearances of chronic inflammation. The *causes* of this form of hydrothorax are the same as those described above (§ 8, 9. 19.)

163. *B.* Symptomatic, passive, or complicated Hydrothorax. — This state of disease is dependent upon some obstacle to the circulation of the blood, or lymph. Its connection with dilatation of the cavities; with hypertrophy, atrophy, &c. of the substance, and with alterations of the valves, &c. of the heart; has been long since pointed out by Bonet, Morgagni, Lieutaud, Meckel, Sandifort, &c. Disproportion between the capacities of the cavities, ossification of the valves, and various other lesions of this organ, have been still more minutely examined in relation to the production of hydrothorax, by Corvisart, Laennec, Testa, Kreysig, Bertin, and others. Varicose dilatation, also, of the veins of the lungs, and compression or obliteration of them, from chronic pneumonia, or tubercular and other productions, are sometimes the immediate causes of effusion. The dependence of this form of the disease upon alterations of the lymphatics, either in their glands or in their trunks, once so strongly insisted upon by the able pathologists already named in connection with this doctrine (§ 27.), although not improbable, has not been established so as to admit it otherwise than as an occasional, and by no means frequent, occurrence.

164. The *fluid* effused in this form of hydrothorax is commonly transparent, colourless, or of a citron tint; in rarer cases, it is of a light brown, or reddish hue, or even sanguineous; its quantity varying from a few ounces to ten or twelve pounds, in both the cavities. In some cases, a quantity of aëriform fluid is also present. (See art. Pleura.) On the evacuation of the serum, the pleuræ are generally observed to be sound; or merely paler, or somewhat softer, than natural. When the accumulation has been great, the lungs are generally pushed up to the vertebral column, are hardly crepitous, and are occasionally pale as if macerated; but they sometimes admit of being distended by insufflation, when they have not been inflamed and hepatised. In this form of the disease, effusion frequently takes place into the pericardium, as a coexistent result of the same organic changes; and occasionally some fluid is also found in the abdomen, or even within the head; but more commonly in the cellular tissue, constituting a more or less complicated or general state of dropsy. M. Rayer justly remarks, that anasarca, hydro-pericardium, and ascites, are more frequently associated with hydrothorax when it is caused by organic lesions of the heart, than when it is consequent upon alterations of the lungs.

165. *C.* Diagnosis. — As hydrothorax is generally produced by anterior disease, it follows, that it will not become manifest until some days, or even some weeks or months, afterwards; or, in cases of organic change of the heart or lungs, not until a few days or weeks previously to death. Even with the aid of percussion and auscultation, small collections of fluid are ascertained with much difficulty, and are marked by the symptoms of the lesions that cause them. But when the accumulation is considerable, it is generally evinced by phenomena which are proper to it. The patient feels an oppression and difficulty of breathing, great in proportion to its quantity. He generally lies upon the affected side, leaving the healthy one unincumbered in its functions. When the fluid is in both cavities, the respiration is still more difficult and short; the patient sits up in bed, and

calls in the aid of all the muscles of inspiration: his countenance assumes a cast of anxiety. **Corvisart** describes the chest as being more distended, and rounded on the side which contains the fluid; and, as the collection increases, the intercostal spaces are widened; the integuments of this side becoming œdematous, and, in a few instances, the arm on the same side. On *percussion* a dull sound is emitted, resembling that produced by striking the thigh on the side containing the fluid, or on both sides when effusion has taken place in both. When the patient sits, or stands up, and the fluid only partially fills the cavities, the lower part of the thorax only will give out a dead sound. This sound generally changes its place with the change of position, owing to the gravitation of the water to the depending part. This, as M. **Piorry** contends, is an important diagnostic between the dead sound of effusion and that produced by hepatisation of the substance of the lung, which always retains the same situation. In the acute states of the disease, a feeling of soreness, tenderness, or pain, is often complained of in or over the seat of effusion.

166. Upon *auscultation*, the respiratory murmur is found to have ceased in the region corresponding to the fluid collection; and in its place is heard the tubular or bronchial respiration. In some cases ægophony is heard when the effusion is not very great. If the fluid be accumulated only in one cavity, *mensuration* of the thorax then becomes a useful mode of diagnosis; but the increased fulness of one side, and widening of the intercostal spaces already noticed, may be recognised at sight. When the collection is very great in one side, not only is the lung compressed, but the diaphragm and liver are pressed downwards; and, if it be in the left side, the heart is pushed towards the right. *Succussion* of the trunk cannot furnish any information, unless air accompany the effusion, in which case fluctuation may be distinctly heard. (See **Empyema**, and **Pleura**.)

167. *Passive* hydrothorax, in itself, frequently occasions but little general disturbance, the functions of respiration being only mechanically disordered by it, unless it exist to a very great degree. The lesions of which it is the consequence are the chief causes of both the constitutional derangement, and the disorders of the respiratory and circulating functions; and, upon the nature of these lesions, the ultimate result more intimately depends, than upon the effusion itself. The great diversity of the primary alterations — whether seated in the lungs, or in the heart and large vessels — is the chief cause of the very great differences remarked in the symptoms and progress of the malady. It becomes, therefore, important to ascertain the nature and seat of these alterations — the true extent of *associated* disease — on account of the diagnosis, and of the indications of cure. The early history of the case, and the immediately antecedent states of disorder, are among our guides in this inquiry. The investigation of these should, therefore, not be overlooked.

168. (*a*) When the effusion has been consequent upon pneumonia, active congestion of the lungs, pleuro-pneumony, phthisis, or bronchitis, the oppression and dyspnœa, characterising the effusion, supervene without the irregularity of the pulse and palpitations attending the cardiac complication. Either in addition to the symptoms of these diseases, or at an indefinite time from their partial or apparently total disappearance, the dyspnœa increases, particularly upon exertion; the patient requires his shoulders and head to be more elevated in bed than usual, and œdema is observed in his eyelids and feet. In this class of cases, the effusion is generally not very great, nor are the œdema and lividity of the countenance remarkable; but he is unable to lie on the side opposite to the effusion, which is most frequently limited to, or at least in greatest quantity in, one cavity; and ultimately he is often unable to lie down in any position. A fatal termination is commonly slow, and attributable more to the alterations of the lungs, which have been increasing with the effusion, than to the effusion itself.

169. (*b*) When the accumulation of fluid has arisen from organic change about the heart and large vessels, the oppression and dyspnœa attending it are associated with irregularity and intermissions of the pulse, with leipothymia, palpitations; very disturbed sleep, sudden startings, and frightful dreams; a livid and œdematous countenance, sometimes anasarca; and sinking of the vital energies. The patient can often lie upon the side most affected, but, more commonly, there is fluid in both cavities, and sometimes in the pericardium also. When it is confined to both sacs of the pleura, he often lies upon his back; but, if all the thoracic cavities be affected, he sits up, leans forward, and brings all the respiratory muscles into action. The quantity of fluid collected is usually greatest in this class of cases; and a fatal issue, although frequently delayed or prevented for a longer or shorter time, is more apt to occur suddenly, particularly in fat or plethoric persons. But, occasionally, before this event takes place, the organic lesions of the heart superinduce congestions of the lungs, or brain, which may accelerate dissolution. Also, if, in either of these classes of cases, any important emunctory ceases to perform its functions, more especially the kidneys, whether from functional or organic change, the effused fluid may excite a low grade of inflammatory irritation or action in the pleura, giving rise to a modification of the effusion itself, as well as to some of the changes observed in the pleura and lungs after death, and which have been too generally viewed as the original disease, instead of being considered a consecutive and contingent occurrence. As to the state of the *excretions* in hydrothorax, they are generally either impeded or disordered. The *urine* is very different in different cases; in the acute and sub-acute forms, it is commonly scanty, high coloured, or deposits a thick lateritious sediment, and often contains albumen, particularly when it is consecutive of eruptive diseases and suppressed evacuations, or associated with acute disease of the lungs. But in the passive and chronic cases, it is often not materially diminished, and is seldom coagulable unless the kidneys become diseased. It should not be overlooked, that the primary lesions in hydrothorax are generally and often necessarily progressive; and that to this circumstance, as well as to the increase of the effusion, the exasperation of the symptoms and its fatal issue are to be imputed. (See also (§ 29, 30.)

170. *D.* Prognosis.—The complicated nature of this malady, the advanced stages of the organic lesions producing it at which it supervenes, and the age and habits of those among whom it is commonly observed, will always influence the practitioner to give an unfavourable opinion of the ultimate issue, although the results of repeated observation will induce him to inspire hopes of affording great relief. But every return of the effusion diminishes the chance of even partial restoration. His opinion, also, will be founded on the nature and extent of the primary lesions, either of the lungs, or of the heart, &c., as made manifest by the auscultatory and rational signs. In every case, however, the prognosis should be guarded; for, under circumstances apparently favourable, an unexpected change may occur from the patient's conduct, or the progressive changes in the seat of disease: and his friends ought to be informed that, even in a state of no very apparent danger, he may be suddenly cut off.

171. *E.* Treatment.—The principles of treatment so fully described in the early part of this article are applicable to hydrothorax. In the acute and sub-acute states, *bleeding*, general or local — more frequently the latter — is required; but it must be practised with caution. The results of experience will confirm the inference at which I arrived above, that, notwithstanding the close resemblance of the morbid appearances, in acute hydrothorax, to those of true inflammation, yet vascular depletions are not nearly so well borne in the former as in the latter, evidently owing to the differences, particularly constitutional, on which I insisted. But the extent to which it should be carried, and mode of practising it, must entirely depend upon the nature of the original lesion, and the state of vital energy and vascular action. Generally, when the lungs are acutely affected, and their substance congested, or when the lesion of the heart is of an acute kind, as active enlargement of its cavities, moderate depletion is both requisite and beneficial. But in the more passive states of the malady, our reliance must be placed on digitalis, and other diuretics, with tonics, &c. In many instances, where depletion — especially local — is obviously indicated, the propriety of supporting vital power, even at the time of unloading the vessels, or immediately afterwards, by the exhibition of gentle tonics and diuretics, cannot be disputed, more especially when the vascular fulness, or morbid action, is secondary merely, and the consequence either of an excrementitial plethora,—in which cases, purgatives, and other medicines calculated to act upon the emunctories, should be also employed, — or of the irritation produced by the properties of the retained fluid. General bleeding is but seldom requisite in hydrothorax; for a sufficient quantity of blood may be taken by *cupping*, which possesses the advantage of producing a revulsive or derivative action. On this account, I have prescribed *dry cupping*, where the abstraction of blood was not indicated. In cases where congestion is superinduced in the lungs, or where hæmoptysis occurs, cupping, or even dry cupping, is a most important part of the treatment, assisted by digitalis, acids, and external *counter-irritation.*

172. *Revulsants* are generally of great benefit, conjoined with antiphlogistic and diuretic remedies, in acute, and with tonics, &c. in passive, hydrothorax. Setons, or issues, near the margin of the false ribs, on one or both sides, are among the best modes of fulfilling this intention. Wendt advises them to be inserted in the chest; and Autenreith directs a blister over the sternum to be kept constantly discharging. *Cathartics*, and *purgatives*, especially the hydragogues, above enumerated, often afford speedy relief; but they are admissible only when the powers of life are not greatly reduced, and in the more acute cases. *Diuretics* are more certainly beneficial in this species of dropsy than in any other; and of this class *digitalis* is the most efficacious, particularly in the form of infusion, and when combined in the manner already shown. The praises bestowed on it by Lentin, Withering, Darwin, Hamilton, Frank, Maclean, Percival, and many others, have been generally acknowledged to be just. *Squills* rank next in utility; but they are not always appropriate, and are even injurious in some of the more acute states of complication, particularly in that with pneumonia or hydro-pleuritis. *Senega* and *ammoniacum*, and the *æthers*, may be used in the passive form of the disease. The propriety of exhibiting diuretics, with tonic infusions, and with antispasmodics, as already advised, is especially evinced in the more passive conditions of this disease. Camphor, ammonia, and the æthers, particularly the spirit. ætheris nitrici, and spir. ætheris sulphur., are of great utility, when thus associated, or when given with purgatives and tonics. The importance of supporting the constitutional powers, in all the more passive states of the cardiac complication, cannot be too highly estimated. In such cases, purgatives should be given only in combination with tonics and antispasmodics; and digitalis will be best exhibited in a similar manner. Formulæ 400. 516. 781. 856. 859. 893, 894., and the following, as well as other diuretic preparations in the *Appendix*, exemplify some of the foregoing combinations: —

No. 190. ℞ Hydrarg. Submur. gr. j.; Pulv. Digitalis gr. j.—ij.; Zinci Oxydi gr. iij.; Pulv. Opii Puri gr. ss.; Syrup. Tolutan. q. s. Fiant Pilulæ ij., bis terve quotidiè sumendæ. (Hufeland.)

No. 191. ℞ Tinct. Digitalis ♏ x.—xvj.; Tinct. Calumbæ ʒ jss.; Spirit. Æther. Sulphur. ʒ ss.; Tinct. Opii ♏ v.; Mist. Camphoræ ʒ xj. M. Fiat Haustus bis quotidiè sumendus.

No. 192. ℞ Pulv. Scillæ gr. j.; Potassæ Nitratis gr. vj.—x.; Sodæ Sub-carbon. exsic. gr. viij.; Sacchar. Purif. ʒ ss.; Olei Anisi ♏ iij. Tere bene simul, et fiat Pulvis ter in die capiendus. (Selle.)

No. 193. ℞ Potassæ Sub-carbon. ʒ jss.; Potassæ Nitratis ʒ ss.; Tinct. Colchici ʒ iij.; Tinct. Aurantii Comp. ʒ iij.; Infus. Junip. ℥ vij. Misce. Capiat Coch. ij. vel iij. larga quartis horis.

When, in addition to diminished tone of the capillaries, the disease is complicated with atonic bronchitis and mucous expectoration, the first of the following recipes may be administered; and when it is associated with torpor of the liver, the latter may be exhibited: —

No. 194. ℞ Pulv. Scillæ exsic. gr. xij.; Pulv. Fol. Digitalis gr. xvj.; Hydrarg. Submur. gr. vj.; Pulv. Gum. Myrrhæ ʒ ss.: tere bene simul, et adde Assæfœtidæ ʒ ss.; et Syrup. q. s. Fiant Pilulæ xxiv., quarum capiat unam quater in die, vel duas mane nocteque.

No. 195. ℞ Gum. Ammoniaci, Saponis Venet., āā ℈ j.; Pulv. Scillæ exsic. gr. x.; Pilul. Hydrarg. gr. xv.; Olei Juniperi ♏ v.; Extr. Taraxaci ʒ j. Fiat massa æqualis, quam divide in Pilulas xxx. Sumantur duæ bis terve quotidiè.

173. *Paracentesis thoracis*, once so strenuously advised, has now fallen into disuse, and is seldom

or never resorted to, excepting in empyema. In some states of the acute disease, especially when the effusion is principally in one cavity, and is not attended by organic changes in the lungs or heart, of a necessarily fatal or dangerous kind, the condition of the patient in other respects not contra-indicating the propriety of performing it, this operation may be as safely and beneficially practised on the thorax as on the abdomen; the same risks — and no greater — existing in respect of the one as of the other. It has been recommended by GOULA, DUVERNEY, BIANCHI, DELAPORTE, MORELAND, HUETTER, MORAND, LULLIER, J. P. FRANK, MURSINNA, BELL, ROMERO, and ARCHER, and practised successfully by nearly all of them. The chief danger proceeds from the introduction and action of the air; but not so much from its preventing the dilatation of the lungs, as from its action on the diseased pleura, and the fluid effused from it, as shown above (§ 157.). (See arts. LUNGS, and PLEURA.)

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VIII. DROPSY, CONGENITAL (*Hydrops Congenitus; Dropsy of the Fœtus and new-born Infant*).

174. DEFIN. — *Effusion of watery fluid in the serous cavities, or cellular tissue, generally consequent upon disease of the mother, or upon organic change in the appendages, or in some of the viscera, of the fœtus, or upon both causes.*

175. Congenital effusions of fluid are found — (*a*) in the ventricles, or between the membranes of the encephalon; (*b*) between the membranes of or in the spinal cord; (*c*) within both the head and the spinal canal, in the same case; (*d*) in the abdominal cavity; (*e*) in the subcutaneous and other parts of the cellular tissue; (*f*) in the cavities of the chest — the pericardiac and pleural; and, generally, in the above sequence, as respects frequency of occurrence. They are observed in the fœtus at the full term of utero-gestation, and in abortions chiefly during the middle and latter months; and are, with the associated diseases either of the uterus or of the appendages of the fœtus, the cause of its death, or of its premature expulsion.

176. i. CONGENITAL HYDROCEPHALUS (*Hydroceph. congenitus*) sometimes appears, as other forms of congenital dropsy, dependent upon disease of the uterus, or on constitutional taint in the parent or parents, or upon organic change in the placenta or umbilical chord. In rare instances it has been associated with ascites in the mother, or with dropsy of the amnion; but it more frequently occurs without any such connection. In these latter cases it may be imputed to a morbid action seated in, and more strictly limited to, the membranes, or internal cavities of the brain. It is often attended by an arrest of the formation of the encephalon at some stage of the process; but, in other cases, the brain is fully, if not more than usually, developed. When the fluid effused, either in the general cavity of the arachnoid, or in the ventricles, is considerable in amount, the ossification of the cranial bones is interrupted generally towards their sutures, but occasionally in other parts; and, in these situations, the membranes are often protruded to a greater or less extent, forming, with the scalp, a watery tumour (*hydrencephalocele*), which may be large at birth, or scarcely perceptible, and may subsequently disappear altogether, or become larger. When the effusion is chiefly in the ventricles, the distended cerebral substance, and the membranes, with more or less of the fluid, constitute the tumour; unless the effusion has taken place previously to, and thereby prevented, the developement of the cerebral substance and hemispheres. Hence the character of the rupture depends upon the situation of the fluid; and its form, upon the size of the aperture through which it presses. Some forms of the disease approach to hemicephaly; a large portion of the cranium being wanting, and the protruding brain being covered by a thin membrane. In other cases, the opening is small, narrow, or cleft-like, and the protrusion is either small or has a narrow neck; the fluid being, in such cases, usually effused between the membranes. These ruptures are most frequent in the back of the head, in different parts of the occipital bone, and in the lambdoidal suture; and less frequently in the top, sides, and front of the cranium. (*See the Cases and Writers referred to.*)

177. Congenital hydrocephalus arises at various epochs of fœtal existence. At the earliest periods, it interferes more or less with, or entirely arrests, the formation of the brain, and cranial

bones. At a later epoch, or that most nearly approaching parturition, the brain and its envelopes may be not merely fully formed, co-existently with effusion, in the ventricles, but even more than usually developed for the period of existence. A very large proportion of cases of chronic hydrocephalus commences before birth; the effusion slowly increasing after this period, and expanding the sutures. Meckel, indeed, supposes that all cases of the chronic internal dropsy of the head begins at this epoch; but certainly, in some, although the smaller number, the disease originates after birth. Not infrequently water collects to an extent that precludes delivery until the head of the fœtus is opened, and the water evacuated. Occasionally the collection is so small at birth, as to render its existence somewhat doubtful, the signs of its presence gradually disappearing with the growth of the infant. In a few cases, in which effusion is more evident, an equally favourable result takes place. Congenital hydrocephalus is often associated with congenital dropsy of the spine, and various malformations. (See Dropsy of the Head — *Chronic.*)

ii. Congenital Dropsy of the Spinal Cord. — Syn. *Hydrorachis, Hydrorhachitis* (from ὕδωρ, water, and ῥαχις, the spine), *Water in the Spine, Spina bifida, Cleft Spine; Hydrorrhachia dehiscens,* J. P. Frank; *Hydrops Spinæ; Wassersuch des Rückgrates,* Germ.; *Idrorhachitide,* Ital.

178. Defin. — *A collection of a watery fluid between the membranes of the spine, generally occasioning a tumour through an aperture in the canal, occurring during fœtal existence, or becoming apparent soon after birth, and observed either in the prematurely born, or in the full-timed fœtus, whether dead or living.*

179. *Congenital dropsy of the spine* is often complicated with internal dropsy of the head, hemicephaly, and with hydrencephalocele; and generally terminates fatally with paralysis. Cases, however, have occurred, of children living several years, and reaching puberty, with the disease. Palletta and Acrel met with one at seventeen years of age; Henderson saw it at eighteen; Warner and Hochstetter, at twenty; Camper, at twenty-eight; and Cowper, one who lived to thirty. I saw the disease, in 1822, in a female of nineteen, who menstruated regularly through ulcers in the thighs. The tumour was about thirty inches in circumference. The excretions were passed in voluntarily; but, in other respects, she was then in good health. She died, however, in a few months afterwards. Although generally congenital, hydrorachis, with an aperture in the canal, has occurred after birth (Frank and Reydellet). In the most complete, but the most rare, form of the disease, the spinal marrow is entirely wanting; the membranes having fallen together, usually slit at one or more places, or more or less degenerated, and adherent to each other, forming sometimes a closed sac filled with lymph (Otto). This condition may even occur without cleft of the vertebral canal. In the less complete states of this disease, the spinal marrow presents its rudimental forms, like pultaceous masses of medullary substance and blood; or loose and separate nervous bundles; or the anterior columns running parallel but separate from each other; or, as in the early stages of formation, open, broad, and flat behind.

180. In the more common state of the disease, there is found only in one, or very rarely in two, distinct places in the spinal column, a more or less large swelling containing water: in some cases flat; in others, semilunar; and in several, necked; their parietes consisting of the expanded spinal membranes, often adherent and otherwise morbid, protruded through the cleft in one or more vertebræ; and connected with the thin and distended common integuments. This watery tumour most commonly appears in the lumbar region, more rarely in the dorsal and sacral, and still more rarely in the cervical, excepting in cases of coexisting hemicephaly or hydrencephalocele, in which the *spina bifida* always occurs in the neck, and, from this point, protrudes more or less outwards. The dropsy of the cervical spinal marrow is merely, in this case, a process from that of the brain; the degenerated brain being directly connected with the diseased origin of the spinal marrow, which is sometimes perfectly natural below. The size of the cleft in the spine varies greatly: generally more than one of the vertebræ are open; and rarely there is found only a small round hole in one bone, by which the tumour is connected with the spinal canal. It is extremely rare to find the bones healthy, and the aperture merely through the intervertebral substance.

181. The seat of the water is originally or naturally in the spinal marrow itself; which, at the part affected, is very much expanded, broken up, and even entirely destroyed; and often exhibits the canal in the axis of the marrow open and expanded up to the brain. The water is also sometimes contained, at the same time, between the membranes of the cord; and, in rare cases, in them alone; whilst the cord itself is either healthy, or merely compressed (Acrel, Palletta, Vacca-Berlinghieri, Urquhart). In those cases where the fluid is contained between the membranes only, there is generally coexistent effusion between the membranes of the brain. When the fluid is in the marrow itself, there is likewise often effusion in the ventricles. Sometimes the swelling also contains hydatids. Dropsy of the spinal marrow occurs, in some rare instances, without any external swelling, and without cleft in the spinal column; so that the canal running in the axis of the spinal cord, and which is generally closed, becomes more or less widely expanded by the water, with coexisting increased thickness of the cord itself (Santorini, Portal, Otto); or the water is effused only in the substance of the cord, and one part of the organ is distinctly swollen (P. Frank). About one half of the hemicephalic monsters have also spinæ bifidæ.

182. Whatever may be the seat of the external tumour, it presents *three varieties* as to its aspect (Billard): — 1st, That with the integuments covering the tumour in a healthy and uninflamed state; 2d, That with the skin discoloured, thinned, and sometimes permitting the exudation of a serous or sero-sanguineous fluid, indicating the approaching rupture of the parietes; 3d, That which is opened, and allows the effused fluid to escape through a fine ulcerated perforation, the vicinity of which is surrounded by a red, rugous,

and unequal elevation. The patient may live several months or years with the first variety of the disease; but death usually soon follows upon the second and third. The *fluid* effused varies in *appearance* with the state of vascular injection presented by the membranes. When these are injected, or apparently inflamed, the fluid is generally more or less turbid, or even flocculent; but this change may arise from the inflammatory action preceding the rupture of the external part of the parietes of the tumour. In other cases, the fluid is commonly limpid and pale.

183. The general *symptoms* of congenital hydrorachis, or cleft spine, are very diversified. They consist chiefly of debility, emaciation; paralysis, generally, of the lower extremities; resolution of the sphincters; anæsthesia; inability to take the breast; convulsions; and stertorous breathing. The *tumour* has usually a globular or pyriform shape; sometimes a broad base, and, at others, a narrow neck; and varies from the size of a hazel nut to that of the adult head, or even larger when the patient lives many years with the disease. Congenital dropsy of the spine, with external tumour, is sometimes *associated* with other congenital diseases or malformations; as dropsy either of the head or of some other cavity; vices of formation in the digestive canal (VOISIN, *Journ. de Méd.* t. xxi. p. 57.; REVOLAT, in Ibid. t. xxvii. p. 378.); umbilical hernia (PREUSS, in *Ephem. Nat. Cur.* vol. viii. p. 128.; SANDIFORT, *Observ. Anat. Pr.* t. iii. p. 1—41.; MECKEL, *l. cit.* p. 679.); malformations of the urinary or genital organs, or the absence of one or more of these (DELFINI, *Opusc. Scelti di Milano,* t. vi. p. 21.; LOBENWEIN, *De Monst. Genit. Difformitate,* in *Mém. de l'Acad. Imp. des Scien. de St. Petersb.* t. vi. 1817.); imperforate anus (LAMARC, in ROUX's *Journ. de Méd.* t. xxxiii. p. 516.); and defect of various parts.

184. iii. CONGENITAL ANASARCA, AND DROPSIES OF THE CAVITIES OF THE CHEST AND ABDOMEN, are occasionally observed, particularly in the prematurely born fœtus, either dead or living; and under the circumstances already stated (§ 176.). The occurrence, unless when the effusion is very great, or associated with extensive visceral disease, should, however, not be viewed as necessarily fatal. Cases have been observed, wherein the collection of water in the abdominal cavity of the new-born infant has been very considerable, and yet recovery has taken place. In some instances, the effusion, in this situation, has been so great as to impede parturition; and, in very rare cases, it has been found necessary to puncture the abdomen of the fœtus before delivery could be effected. *Congenital encysted dropsy* is very seldom met with. The case recently recorded by M. PETIT-MENGIN is one of the most remarkable on record.

185. iv. CAUSES OF CONGENITAL DROPSIES. — (*a*) The *remote causes* of congenital dropsies are not frequently very obvious. They have been stated to consist of constitutional vice in the parents, particularly the mother; the syphilitic taint; the scrofulous and rickety diatheses; violent mental emotions, as fits of anger, fright, &c.; whatever inordinately excites the circulation in the uterine organs during pregnancy, as excessive venereal indulgences (KLINKOSCH, J. FRANK); external injuries affecting the uterus or its contents; violent concussions of the trunk; and suppressions of urine in the mother (FRANK, BILLARD, &c.). — (*b*) The more *immediate causes* are organic changes, and hydatids, in the placenta; alterations in the umbilical cord; tumours or other lesions of the uterus; inflammations or congestions in the viscera of the fœtus, or inflammatory irritation in the serous membranes; tubercles in the liver and lungs; and tubercular thickening of the serous surfaces. The three cases recorded by Dr. R. LEE occurred in connection with dropsy of the amnion, and with disease of the placenta, and of some one of the viscera of the fœtus. In two, the effusion was seated in the peritoneal cavity, and in one of them it was associated with anasarca. It has been remarked by MICHAELIS and some other writers, that congenital dropsies, especially *spina bifida,* often occur in the same families with rickets.

186. v. TREATMENT. — Congenital dropsies may be somewhat benefited by medical treatment. When the aqueous collection is not great, and when the infant is well-formed, fully developed, and evinces little or no disease of any vital organ, we should not despair of success.—(*a*) Of the treatment of *congenital hydrocephalus,* particular mention will be made in that part of this article in which chronic hydrocephalus is discussed; and the same measures which will be recommended in dropsy of the spine with external tumour, are in great measure applicable to the congenital collection within the head, but more particularly to that form which is attended by imperfect formation of the cranial bones and protrusion of the membranes and other parts external to the seat of the collection (*Hydrencephalocele,* see § 176.). In most instances of congenital hydrocephalus, bandaging the head, and continued but gentle pressure, aided by the rest of the means advised in the next paragraph, seem most appropriate.

187. (*b*) *Of dropsy of the spine, &c.*—The removal of this form of disease by *ligature* was practised unsuccessfully by HEISTER; and was more recently recommended by B. BELL. But what has been stated above relative to the pathological relations of the tumour, independently of the circumstance of its form being such as not frequently to admit of this treatment, will show that this method can be but seldom appropriate, and that it must be generally hazardous. Gentle *pressure* has been advised by Mr. ABERNETHY, and successfully employed in a case by Sir A. COOPER, who also resorted to *puncture* in another case, with a similar result. These methods have, however, been often practised in the dropsical tumours, both of the spine and of the head, but very rarely with advantage. In a case, however, of the latter kind, Mr. E. THOMPSON succeeded by applying a ligature. RICHTER recommends setons to be inserted at a short distance from the tumour; CAMPER and ACREL, the application of discutient lotions; DE HAEN, the employment of defensive plasters; and BILLARD, gentle and continued pressure. CAMPER, BORSIERI, the FRANKS, RACCHETTI, and OLLIVIER, are strongly opposed to repeated punctures; and state, that they excite inflammatory action in the membranes, and hasten an unfavourable termination. I believe that the tumour should be as little interfered with as

possible; that, if any local medication be resorted to, a simple discutient lotion — as one of vinegar, rose water, and spirit, or liq. ammon. acetatis — or a defensive and discutient plaster, with gentle pressure, will be found the safest and most successful; — that, in addition to this, the abdominal secretions and excretions should be promoted, by means the least calculated to lower the vital powers; — that a healthy wet-nurse should be provided, to whom a gentle course of iodine may be administered; — that change of air, or residence in a warm and dry air and locality, be directed; — and that the infant should wear soft flannel next the skin, and be warmly clothed. These have been the means I have employed in most of the cases of the disease I have treated; and they have often prolonged life, and diminished the tumour, although, in many instances, I was unable to learn the ultimate result. When the exterior of the tumour becomes inflamed, or the integuments thinned and disposed to ulceration, puncture may be then resorted to, as in the case recorded by Mr. ABERNETHY; but care should be taken to close the opening accurately after each operation, and to protect the part from the air and external injury by suitable applications. (See DROPSY OF THE HEAD — *Treatment of Chronic.*)

188. (*c*) As to the treatment of the *other forms of congenital dropsy*, but little need be added to the above. In some instances, it may be requisite to commence with the application of one or two leeches. Purgatives are generally requisite, and should be often repeated, and alternated with, or followed by, diaphoretics and diuretics, and assisted by the use of slightly alkaline baths, of a temperature ranging from 85° to 94°. Many of the cases of these forms of congenital dropsy are beyond the reach of medical aid; but, when the infant is in other respects well formed and strong, the existence of active congestion in, or of vascular determination to, some one of the viscera of the cavity in which the collection is formed, or of inflammatory irritation in the serous membrane, may be suspected, and moderate local depletions, and active alvine evacuations, aided by means calculated to relax the cutaneous surface, should be employed.

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IX. DROPSY, ENCYSTED. — SYN. *Hydrops Saccatus*; *Hydrops Cysticus*, Auct. var.; *Die Sackwassersucht*, Germ.; *Hydropisie enkystée*, Fr.

189. DEFIN. — *The fluid enclosed in a cyst, generally of a serous structure internally, and of adventitious formation; giving rise to local symptoms resembling those caused by effusion into natural cavities.*

190. The origin of *serous cysts* is discussed in the article DISEASE (§ 114.); it therefore remains only to notice those excessive collections of fluid in them, which are distinguished with difficulty from accumulations in natural cavities. The encysted productions, which either contain more or less consistent secretions, or are of so small size as not materially to affect the bulk of the organ in which they are seated, or the functions of parts adjoining, are considered in connection with the other lesions of their respective seats. In the view about to be taken of encysted collections of fluids, mention will be made only of those which possess, in many respects, a dropsical character, and which have generally been considered as such by writers and practitioners, although even they may possess no true claims to this distinction.

191. *A.* CAUSES. — The causes of common dropsy have generally no influence in producing the encysted. The same state of action, to which the formation of the cyst in the first instance is to be attributed, evidently is the main agent in the secretion of its accumulated contents. Of what this state consists, and of the causes in which it originates, but little is really known. When remarking on this and similar changes (see DISEASE, § 111.), I stated that the origin of serous cysts cannot be considered as truly inflammatory; but that it may be imputed to a modified nutrition, frequently connected with a weak-

ened or depraved state of the constitution; modifications of the formative processes — of the organic actions of secretion and nutrition — being more apt to occur from causes which deflect them from their healthy course, in such constitutions, than in the sound and vigorous. This view is important, inasmuch as it is based on an attentive observation of a number of cases of this description, and as it leads to a more successful practice than is too frequently adopted.

192. *B*. Prognosis. — Encysted collections of fluid, as long as they do not reach the extent of impeding the functions of adjoining organs, seldom occasion any serious disturbance. In this respect they are different from effusions into natural cavities; and, when they give rise to dangerous or fatal results, it is owing more to this injurious action on surrounding parts, than to any change they induce in the circulating, secreting, and natural functions. When not injuriously interfered with, and when the system is not improperly lowered, or if it be enabled to resist their increase, all the functions frequently proceed without any material disturbance, and these collections often remain long stationary. But, when the constitutional powers receive a severe shock from any cause; when the patient is imperfectly fed, or is made the subject of a meddling or active surgery; the cysts become the centre of a morbid determination of the organic actions; chronic inflammation supervenes in them; the accumulation of fluid advances rapidly, and the vital resistance is subdued. In some cases, the secretion proceeds in the interior of the cyst with greater rapidity than the cyst itself can either yield or be developed, and hence it is ruptured, and its contents effused. This circumstance may hasten an unfavourable issue; or, when the cyst is small, favour its disappearance or transformation.

193. Encysted dropsies are, with some exceptions, incurable when they have reached a large size, and when, either from this circumstance, or from their situation, they admit not of being removed entirely. But, in many instances, especially when they are seated in the ovaria, a judicious constitutional treatment will often prevent their increase for years, — sometimes during the greater part of a very long life, — or will even cause their entire disappearance, or transformation into an inert substance.

194. *C*. Treatment. — As to the indications of cure, only a few general observations are here necessary. In all encysted formations, particularly in those now under consideration, it may be viewed as a law, from which there are extremely few exceptions, that, in proportion as vital power, and its manifestations in the secreting, assimilating, and excreting organs are promoted, without materially exciting the vascular action, or heating the body, will the progress of these productions be overcome, or their diminution effected; whilst their increase will be both great and rapid in an equal ratio with depression of constitutional energy, or with disorder of any of the functions now alluded to. A healthy and vigorous performance of the various organic actions resists the progress of all adventitious formations; and an opposite state favours their increase. This rule holds in respect of all productions of a parasitic kind, and in all the kingdoms of organised nature, and is observed in both the *physical and moral manifestations*. The parasitic formation or animal can grow only at the expense of the weak; the robust frame resists it, and denies it nourishment; whilst the weak furnishes it with means which are slowly but surely turned to its own destruction.

195. During the treatment of encysted dropsies, care should be taken not to resort to any measures that may irritate or inflame them, particularly when they have acquired a large size. On this account, *puncturing or paracentesis* should be resisted to the utmost — until extinction of life would follow on its being longer deferred; and, when thus made a *dernier ressort*, the operation should be performed by a scalpel and lancet, with which latter the sac should be opened; the utmost care being taken not to admit the air. I have seen, on numerous occasions, the ill effects of not attending to this injunction, and of leaving a canula, or tent, in the wound, the inflammation thereby induced in the cyst, giving rise to so extensive a secretion, and so much constitutional disturbance, that the patient has rapidly sunk.

196. The *preparations of iodine*, when judiciously exhibited, are the most generally applicable and efficacious means that can be employed in this class of diseases. But they ought to be exhibited in very small doses, much diluted or reduced, and long persisted in. They become injurious as soon as they give rise to the slightest indication of irritation of the digestive organs. I have employed them extensively and constantly since 1819, when I brought some of them with me from the Continent. At that time they could not be procured in London. They are most beneficial when prescribed internally; but they are also of use externally, if they be directed so as not to inflame the part to which they are applied (see F. 332. 766—769.). When the debility is considerable, the *ioduret of iron*, taken in any aromatic infusions, the secretions and excretions being at the same time promoted by an aperient pill at bed-time, will be of essential service. I have lately prescribed it in several cases of cachectic disease, with remarkable benefit. The *diet*, in all encysted dropsies, should be light and nutritious; and the patient's mind be agreeably engaged: *change of air*, or residence in a pure, temperate, rather warm, and dry air, ought also to be recommended.

197. The situations in which encysted dropsy is most frequent, are numerous; and if all the places in which large serous cysts have been developed were taken into the account, it may be said that they comprise every part and organ of the body. Encysted dropsy, however, has been observed *under the integuments*, by Schenk, Van Swieten, Cruveilhier, and others, forming very large lymphatic tumours; *within the head*, as shown in the article Brain; between the *pleura and the intercostal muscles* (Haller, Desault, &c.); in the *mediastinum*; in the substance of the *lungs* (Stoërk, Maloët); in the *cavity of the thorax*, and in that of the *pericardium* (Mercker, Dupuytren, Itard, &c.); between the *peritoneum* and abdominal parietes (Acholzius, Morgagni, Morand, and J. P. Frank); in the *ovarium*, forming ovarian dropsy; in the *Fallopian tubes* (Riedlin, Douglas, Blankard, Baillie, Seymour, &c.); in or connected with the *uterus*, — *Hydrometra*, *&c.* (Gruner, Odier,

Lafosse, Rayer, Thomson, &c.); connected with the *liver* (Alix, Corvisart, Leroux, Frank, Lassus); in the *kidney* (Morgagni, Houston, Walter, Corvisart, J. Johnson, Howison); in the *omentum* (Hasenoerhl, De Haen, Portal); in the *mesentery* (Horstius, Tulpius, Sauvages, Morand); and in the *spleen* (Morgagni, Baader, &c.). Of the most important only of these, I now proceed to take a more particular notice. In some cases of very large encysted dropsy seated within the abdomen, the exact origin of the cyst can hardly be ascertained. Of this kind appears to be the instance recorded by Mr. Coulson (*Med. Gazette*, vol. ix. p. 577.), which was frequently tapped. Upon dissection, the cyst was found to adhere to the abdominal parietes, and to several of the viscera, and to consist of three layers. The ovaries were healthy. Similar cases are published by Portal and Cruveilhier (*Anat. Patholog.* vol. i. p. 268.).

i. Dropsy of the Ovarium. — Syn. *Hydrops Ovarii, Ovarian Dropsy, Dropsy of the Ovary; Hydroophorie,* Boivin and Duges; *Die Wassersucht der Eierstöcke,* Germ.; *Idropisia di Ovaria,* Ital.

198. Defin. —*Swelling, commencing with tenderness, pain, or weight in the iliac region of one or both sides, and irregularity of the menstrual discharge; the swelling gradually extending over the abdomen, and attended by obscure fluctuation.*

190. *A.* Pathology.—This is the most frequent species of encysted dropsy, and of the greatest importance in a practical point of view. It is very often complicated with other organic changes in the ovaria (see article Ovaria — *Diseases of*), peritoneum, uterus, and tubes; but it also frequently consists only or chiefly of a collection of a greater or less quantity of fluid in one or more cysts, into which the substance of the ovarium seems to have been converted; owing to the enlargement of one or several of them giving rise to atrophy of the proper structure of the organ. These cysts have been mistaken for hydatids, from which, however, they may be distinguished by their being nourished by vessels supplied from the parts in which they are formed; whilst hydatids are not thus supplied, but are nourished by their own vessels, and have an independent life. Sometimes "one or both ovaria are converted into simple cysts; the whole of the cellular substance and vesicles disappearing, that which was the fibrous coat of the ovarium becoming the fibrous coat of the cyst." (Dr. Seymour.)

200. The Graafian vesicles, which, in the healthy state, are of the size of millet seeds, frequently become as large as almonds, are filled with a limpid fluid, and their internal membrane is very vascular. This appears to be the commencement of the simplest form of ovarian dropsy; or, at least, a change, which may proceed no further, but which sometimes does proceed to an extent which constitutes this disease. When these vesicles enlarge to a greater degree than the size of a filbert or almond, it is always on the side nearest the proper coat of the ovarium; the rest of the ovarium, as shown by M. Cruveilhier and Dr. Seymour, appearing, when the cyst reaches a large size, as if atrophied at the parietes of the cyst. In this manner is sometimes formed an enormously large single cyst, having the proper fibrous coat of the ovarium and peritoneum for an external covering; the internal membrane, or the parietes of the vesicle, secreting a prodigious quantity of fluid. In many of these cases, especially in those of long duration, the parietes of the cyst undergo various changes, and are thickened, hardened, cartilaginous in parts, or even ossified. Their external surface, in their earlier stages, are sometimes smooth, not infrequently inflamed or very vascular; and form adhesions with adjoining parts of the peritoneum and contiguous viscera, or with the fimbriated extremities of the broad ligament, or with the fundus of the uterus (Boivin, Seymour, Duges). In their more advanced states, also, their surface becomes the seat of chronic inflammation, of tuberculation, or both; and in this change the rest of the serous surface of the abdomen, or parts of it only, may participate. In some instances, the marks of associated inflammatory action in the peritoneum are indistinct; but this membrane not infrequently contains, in these cases, more or less fluid, the encysted dropsy thus being complicated with ascites. The interior of the sac, or cysts, is commonly smooth, and resembling a serous surface (Morand, Burns); or it is lined with a false membrane: it is, in some cases, irregular or mamelonated; and, in others, imperfectly divided by incomplete partitions (Cruveilhier).

201. The *fluid* contained in these cysts varies remarkably. In some cases, particularly when it is lodged in one, or a few cysts of a very large size, it is serous, or mixed with a ropy or mucous matter. In others, it is dark-coloured and resembles coffee. Where the cysts are more numerous, their contents are generally thick, gelatinous, and of a brown colour of varying depths of shade. The fluid is also, but more rarely, of the appearance and consistence of custard; and occasionally it resembles honey. I have seen it, in some instances, where the accumulation was remarkably great, brown, thick, and gelatinous; and in others, its characters have changed at subsequent stages, especially after tapping; and it has become greyish, dissolved, ichorous, flaky, or puriform and even offensive. The quantity which collects, particularly when there is only one cyst, and when its contents are serous or watery, is sometimes very great. Wepfer, Haller, Monro, and Frank have found as much as 120 pounds of fluid in a single cyst, and Müller as many as 140 pounds. When the necessity of resorting to puncture has once become imperative, the rapidity with which the fluid is again formed is often remarkable. Morand drew off 427 pints in ten months; and Martineau nearly 500 in a twelvemonth; and, from the same patient, upwards of 6600 pints, by eighty operations, within twenty-five years. Sir A. Cooper thinks, with great probability, that the case of Mrs. Mumford, who was tapped 155 times in less than four years, was one of ovarian dropsy. When the ovarium contains a number of cysts, is lobular, and irregular in its surface and firmness, each of the individual cysts often is filled by a different and peculiarly characterised secretion — which is either watery, gelatinous, sanguineous, fatty, &c.; and, when the tumour has been punctured, partially decomposed or putrid, and mixed with gaseous fluids (De Haen, Boivin, Duges, and myself). In rare instances, sebaceous matters with long hair have been found in the same ovarium that con-

tained large dropsical cysts, and even in the same cyst with the watery collection: the cyst in which the hair and fatty substance had been formed having subsequently become the seat of dropsical effusion.

202. *B.* CAUSES.— (*a*) The *predisposing causes* are, the scrofulous diathesis; debility, however induced; frequent or excessive menstruation, and venereal indulgences. The disease occasionally commences as early as the first appearance of puberty. J. P. FRANK saw it at thirteen, and M. ITARD at fourteen years of age. MARJOLIN states, that it may begin before puberty; but I know of no such occurrence. It is most common between the ages of twenty and fifty. It may commence soon after the cessation of the catamenia; but, although chronic cases of it are found in very old females, yet it rarely originates at an age much beyond fifty. It often follows abortions.

203. (*b*) The *exciting* causes have not been satisfactorily shown: but it has been very generally imputed to external injuries, successions of the pelvis, the mismanagement of parturition and abortions; or to cold, fright, and anxiety of mind. From much attention to this disease, I have inferred that it is occasionally consequent upon inflammatory action in the ovaria or uterus, or connected with this change in its earlier stages. Hence its causes may be considered to be, in some cases, those in which inflammatory action in these organs generally originates. Yet there are numerous objections to this view; for even when the tenderness and pain in the region of the ovaria, accompanying its commencement, are greatest, there is also a frequently recurring and copious menstruation, indicating an excited, rather than an inflamed, state of these organs. From various considerations, and a review of the circumstances in which the disease seemed to originate, it is not improbable that it is connected with an often excited, but an imperfectly gratified, sexual appetite. Hence its frequency in females who are sterile, or whose state of health is insufficient to the developement of a healthy and vigorous orgasm, owing either to premature and illicit indulgences, or to previous disease.

204. *C.* SYMPTOMS AND PROGRESS.— Ovarian dropsy is very commonly far advanced before recourse is had to medicine. It usually commences with irregularity of the menstrual discharge, and disorder of the excretion of urine, which is either voided frequently, or is long retained. There is also severe pain in the loins, with pain, tenderness, and swelling in one or both iliac regions. In some instances, the pain shoots through the abdomen, and down the thighs; and occasionally there is numbness, hæmorrhoids, or complete strangury, owing to the pressure of the enlarged ovarium before it rises out of the pelvis. The catamenia, at this period, is frequently either copious or of too frequent occurrence; but it is rarely altogether suppressed. Various hysterical symptoms also come on; and disappear at a later stage. The bowels are usually costive; but they are sometimes irregular, or relaxed. As the malady proceeds, the patient experiences various dyspeptic symptoms, and often nausea and vomitings, as in the early months of pregnancy. The mammæ also enlarge, and the areolæ around the nipples assume a darker shade. Dr. SEYMOUR states, that, when both ovaria are affected, the catamenia are always absent; but, when one only is diseased, this evacuation is either absent or irregular. This does not agree with my experience, the results of which I have just now given, as regards the early stages of the disease; but, as respects the last stages, particularly in the more chronic cases, the observations of this physician seem to be correct. With the increase of the tumour, various inflammatory phenomena, referrible chiefly to the peritoneum, and commencing in the pelvis, but often extending upwards to parts of the abdomen, supervene.

205. The *progress* of the tumour and abdominal enlargement is extremely various. Occasionally the ovarium, whether it consist of a number of cysts, or of one or few, increases very slowly. It sometimes remains long stationary; afterwards augments rapidly, and fills, ultimately, the whole abdomen; and in rarer instances it recedes, or even entirely disappears. It proceeds more regularly, however, in most cases, until it gives rise to appearances rendering the diagnosis very difficult. The general health, as already stated in respect of encysted dropsies, continues but little impaired, until the morbid accumulation has advanced so far as to disturb the functions of adjoining viscera; but this is not uniformly the case; for the means used to cure it not infrequently are sources of disorder, deranging the natural functions, and thereby favouring the increase of the disease. When the collection rises as high as the epigastric region, and the abdominal distension is great, the functions of the stomach are often completely overturned, and the constitutional powers rapidly sink; singular and unexpected changes, however, sometimes occur, even in the most chronic cases. Dr. BAILLIE mentions an instance of its spontaneous disappearance, after it had existed thirty years; the patient remaining, subsequently, in good health. The accumulated fluid is also occasionally discharged into some part of the large intestines, having previously formed adhesions with it; or into the vagina, pressure on the tumour increasing the discharge. Instances of this have occurred to Dr. ELLIOTSON, Dr. MONTGOMERY, myself, and others. In a case treated by me some years ago, and put upon a course of iodine, the catamenia were profuse every fortnight or three weeks. The tumour, which filled the whole abdomen, remained long stationary, and ultimately burst into the large intestines. It did not return again until upwards of a twelvemonth: ultimately the patient was so much benefited as to leave off treatment. Dr. SEYMOUR adduces an instance, in which the morbid collection was discharged both by the intestines and by the vagina, and recovery took place. Sometimes it forms adhesions to the abdominal parietes, and bursts externally at the umbilicus. A permanent cure is often effected by judicious management under the foregoing circumstances. A case was seen by me, in which adhesion of the tumour took place, to the parts adjoining the puncture by which its contents had been drawn off. The cicatrix ulcerated, and the fluid was afterwards discharged by degrees through the opening, and the patient recovered. A nearly similar instance of recovery occurred in the practice of Mr. BARNWELL. When the fluid finds its way into the peritoneal cavity, the result

is, in my opinion, generally fatal, although some authors contend that the fluid may be absorbed from this situation, and the patient recover. This, however, is certainly a very rare occurrence. The best authenticated case of restoration from effusion of the contents of the ovarian tumour into the abdomen is recorded by Dr. Blundell, in his published lectures.

206. *D.* The Diagnosis of ovarian dropsy is not always easy. It may be mistaken for pregnancy, for ascites, for hydrometra, or for tumour or abscess of some adjoining part. The appearance of swelling and pain in one side, or both, of the pelvis, in connection with irregularity, without suppression, of the catamenia; this swelling being at first but little, or not at all, changed by position — by lying on either side or by the erect posture; — obscure fluctuation as it expands, with a sense of elasticity, and sometimes of irregularity in it; — the motions and activity of the patient not being very materially impaired, or not in proportion to the magnitude of the tumour; — the principal abdominal organs not having evinced much disorder, or signs of organic change, previously to the swelling, and their functions not being greatly disturbed during its course; — its slow increase, its situation, its direction to one side and limitation to the lower regions of the abdomen when the patient is supine, until a late stage of the disease; — the inefficacy of purgatives and of diuretics in producing any diminution of it, and the not materially lessened secretion of urine, until after the disease has advanced very far, or until the fluid has been drawn off by art; — the more healthy aspect of the patient than in ascites, — and pain, stupor, or œdema of the thigh, leg, and ancle, having been complained of, on the same side with that where the swelling commenced, — will serve, when carefully considered, either separately or in conjunction, to guide the practitioner. These phenomena, however, may not be uniformly present, but many of them will — and will be so associated as to leave little doubt as to the nature of the disease, particularly when aided by an examination *per vaginam*, and also *per rectum*. At the commencement of the malady, the local symptoms have sometimes been so manifest, and attended by so much pain in the back, and pain and œdema of the lower extremity of the same side, as to have been mistaken for *psoas abscess*. The disordered excretion of urine and strangury, and the evidence obtained by examination, will, however, generally indicate satisfactorily the nature of the disease. Dr. Macintosh states, that the tumour may sometimes be felt between the vagina and rectum, before it becomes much enlarged; the *os uteri* being, in such case, tilted forwards close to the symphysis pubis, so as to resemble *retroversion of the uterus;* but an examination by the rectum will make the nature of the affection evident. When the increase of the ovarian tumour is slow, and it rises in the abdomen by a narrow neck before it is perceived, it may be mistaken for *enlargement* of some other organ; especially if it have formed adhesions with the parts in contact with it. The difficulty of diagnosis is also increased by the presence of fluid in the peritoneal cavity, — a circumstance which occasionally occurs. When this is suspected, or when the diagnosis is difficult, the patient should be examined in the recumbent posture, when the ascitic fluid will be found to gravitate towards the hypochondriac and lumbar regions; and the limits of the ovarian tumour may be ascertained. The history of the early stages of the case, and the recurrence of the catamenia during the greater part, or even the whole, of its course, its chronic duration, and the absence of the progressive changes of the os uteri characterising *pregnancy*, will sufficiently distinguish it from that state; the uterus being moveable and light upon examination *per vaginam*, pressure on the hypogastrium at the time not affecting, or propagating any movement to, this organ.

207. *E.* The Prognosis will depend entirely upon the constitutional powers of the patient, and the progress the disease has made. Although it should be generally unfavourable, and always expressed with caution, and with much reservation, even in cases apparently the most favourable, yet we may entertain reasonable hopes that the progress of the disease may be checked by careful regimen and treatment, particularly when the energies of the constitution are unbroken, and the digestive and excreting functions are not materially disturbed, nor the progress of the swelling rapid. J. P. Frank met with a case where it commenced at thirteen, and yet the patient reached the great age of eighty-eight years. The occurrence of tenderness in the abdomen, any manifest diminution of the patient's activity, its complication with ascites, emaciation, accelerated pulse, great disturbance of the functions of the stomach, and the necessity of having recourse to paracentesis, are all unfavourable circumstances.

208. *F.* Treatment. — The utmost care should be directed to the removal of all sources of irritation from the uterine and adjoining viscera. The urine ought to be drawn off, if its excretion be interrupted; and particular attention should be paid to the state of the bowels, the evacuation of which must be procured daily, by cooling aperients, or laxatives conjoined with gentle tonics, when they require it, or by means of tepid and emollient injections. In the early stages of the disease especially, and when pain, tenderness, and other symptoms of inflammation are present, particularly if the catamenia are deficient or delayed, local depletions by cupping on the loins or sacrum, or the application of leeches, or cupping about the tops of the thigh, are requisite. External irritation should afterwards be prescribed; and, as soon as the symptoms of inflammation are removed, the patient should be put upon a mild course of *iodine*. The mode of counter-irritation deserves attention. Blisters increase the strangury that is often present at this stage, and excite the vascular system. I have usually, therefore, had recourse to the tartarised antimonial ointment, or to the insertion of issues or setons in the insides of the thighs. When symptoms of irritation exist in the uterine and urinary organs, they must be removed, by the sub-carbonates of the alkalies, with nitre, taraxacum, and hyoscyamus given in the infusion of calumba, or the infusion of cinchona. The course of iodine should be assiduously persisted in, and the preparations adopted should be given in small doses, much diluted. The *hydriodate of potash*, or the *ioduret of iron*, are upon the whole the preferable combinations of this substance. Iodine, in some one of the preparations — liniment or ointment — may also be

used externally. In this case it should be rubbed upon the insides of the thighs; where, if it should produce irritation of the integuments, the effect will be the more salutary.

209. *Cathartics* and *diuretics* have no influence upon the disease, further than to accelerate its progress, if they be used in such a manner as to weaken the powers of life. Purgatives of a tonic kind, however, may be employed to evacuate fæcal matters, and to promote the intestinal secretions; but such only, as are not calculated to excite or irritate the large bowels, should be selected; as the supertartrate of potash with confection of senna, or the infusion of calumba or of gentian with infusion of senna. As to *diuretics*, I have seen no benefit derived from them, with the exception of those which possess tonic and astringent properties, as the balsams and terebinthinates; the latter of which have been productive of benefit, particularly when used in the form of liniment or epithem. Camphor and narcotics are also useful palliatives, especially opiates. The *liquor potassæ*, and BRANDISH's *alkaline solution*, in suitable vehicles, and aided by sarsaparilla, by local depletions when tenderness in the situation of the tumour is perceived, and by setons, have also been of great service in some cases in which I have prescribed them. The good effects of vomiting in swelled or inflamed testicle have induced some practitioners to have recourse to *emetics* in the early stage of this malady. Dr. PERCIVAL records a case in which they proved of service; but I have had no experience of the practice. Mr. ABERNETHY prevented the reaccumulation of the fluid after tapping, by repeated blistering. Dr. HAMILTON (*On Mercurial Medicines, &c.* p. 202.) states that he has cured seven cases by percussion, or patting, for a long time daily, on the tumour, using a bandage so as to make constant compression, giving a solution of the muriate of lime, and employing the warm bath. Many instances will, however, be found to confirm the opinion of Dr. W. HUNTER (*Med. Observ. and Inquiries*, vol. ii. p. 41.) "that the patient will have the best chance of living longest under it, who does the least to get rid of it." In addition to the above means, but little can be attempted with much hopes of success. The chief objects are to support the vital energies throughout the frame, — to promote a healthy assimilation, and the excretion of effete matters, — to ward off all irritation, physical and moral, from the uterine organs, — to adopt a light, cool, and moderately nourishing diet, — to engage the mind agreeably, — to reside in a dry, airy, moderately warm, or temperate locality, — to take regular but gentle exercise in the open air, — and to have frequent change of scene and atmosphere.

210. *Paracentesis* in some instances becomes imperative, owing to the urgency of the symptoms, particularly after it has been once performed; and the *extirpation of the tumour* has been recommended by VANDER HAAR, DELAPORTE, MORAND, LOGGER, SIEBOLD; and practised by L'AUMONIER, SMITH, LIZARS, BLUNDELL, GRANVILLE, M'DOWAL, and DIEFFENBACH. Of these measures a brief notice is required. — (*a*) The observations which have been already offered on *paracentesis* apply to the treatment of ovarian dropsy even more fully than to any other. It often accelerates a fatal issue by inducing inflammation of the sac. Of this I saw a remarkable instance many years ago in a near relative. Dr. J. JOHNSON has adduced an example of it (*Medico-Chirurgical Review*, vol. xi. p. 258.). Dr. MACINTOSH refers to one in his practice (*Practice of Physic*, vol. ii. p. 374.); and many others have been recorded, and observed by experienced practitioners. I therefore agree with Dr. DENMAN, that paracentesis ought to be deferred as long as possible. In such circumstances, this operation occasionally gives temporary relief; but there is a frequently recurring necessity for its repetition until the patient sinks. It has been proposed to effect a radical cure by evacuating the matter, and either laying open the tumour, or keeping a canula inserted in the wound. LE DRAN mentions two cases which recovered from great suffering consequent on this measure; and analogous examples have been recorded by HOUSTON, VOISON, and PORTAL. But these are few compared with the numerous instances in which it has either failed, or accelerated a fatal issue by the severe inflammation and constitutional disturbance thereby induced. In two cases in which I was consulted, a canula had been left in the puncture, and rapidly produced these effects; the introduction of air and the mechanical irritation having inflamed the cyst and peritoneum, and converted the secretion to a foul, fœtid, and ichorous discharge: both rapidly proved fatal. It has likewise been proposed to inject the cyst. Dr. DENMAN mentions a case in which this was practised, but the patient died on the sixth day afterwards.

211. The *extirpation* of the tumour, although entertained by the older surgeons, was discountenanced by MORGAGNI, DE HAEN, SABATIER, and MURAT. L'AUMONIER, of Rouen, however, performed this operation successfully towards the close of the last century; and it has recently been practised by Dr. SMITH and Dr. MACDOWAL, of the United States, with a like result. Notwithstanding the favourable issue of these cases, I stated, in the *Medical Repository*, at the time of their publication, reasons against resorting to this measure. The issue of several cases in which it has since been performed, both in this and other countries, confirms the opinion I then expressed. The operation has no chance of succeeding unless it be resorted to during that stage, at which a judicious constitutional treatment may either delay, or even remove the disease: and I believe that the cases in which it has succeeded are such as would have terminated favourably if they had been left to nature or to medical management. The results of the cases in which it was performed by Mr. LIZARS and Dr. BLUNDELL, are well known; and I may add that it has likewise been attempted at least five times at Berlin, by DIEFFENBACH, CHRYSMER, and MARTINI (GRAEFE and WALTHER's *Journ.* b. xii. h. i.), and, excepting in one instance, it entirely failed. Three of the patients died in consequence of the operation. In one case the surgeon did not proceed in the operation, on finding the tumour adherent on all sides.

212. ii. DROPSY OF THE FALLOPIAN TUBE — *Hydrops tubalis* — is not to be distinguished from ovarian dropsy; nor, indeed, does it differ from it further than that, instead of the cyst being in the ovary itself, it is developed in the fold of the ligament, near the uterus, or close to the ovarium, or to the fimbriated extremities of the tube; these extremities being either adherent to the ovarium, or

closed by coagulable lymph, or adhesions. In either case the cyst is solitary. The disease has been described by Dr. Baillie; by Munnik, who found the cyst contain as much as 110 pounds of fluid; by Cypriani, who found 150 pounds; by Harder, who found 140 pounds; and by others, who have observed much smaller quantities. Dr. Good defines this variety of dropsy as commencing with a heavy elongated intumescence of the iliac region spreading transversely, with obscure fluctuation; but no distinction can be made between it and ovarian dropsy, in respect either of its causes or progress. The *treatment* of this variety is also the same as that of the ovarian disease.

213. iii. Dropsy of the Womb — *Hydrometra — Encysted Dropsy of the Uterus* — has been doubted by some authors: but it has been not infrequently observed by physicians of the greatest reputation. The cysts which are, in rare instances, found attached to the exterior surface of the womb, do not belong to this disease, which consists of *a collection of fluid in the cavity of the unimpregnated uterus, contained in a membrane or cyst.* It has, however, been disputed whether the fluid is thus surrounded, or whether it has accumulated in consequence of inflammation having occluded the os uteri by the deposition of coagulable lymph, or of the developement of some tumour or growth, plugging up this outlet; the morbid action which occasions the latter also giving rise to the secretion of a great quantity of serous fluid, which accumulates in consequence of this obstruction. It is very probable that this affection may arise from either of these causes, in different cases; and that, in its slighter grades, it is not so infrequent as some writers suppose,—the dilatation of the uterus, and the pressure of its parietes, overcoming or rupturing the obstruction at the mouth of the womb, and causing the fluid to escape. A considerable proportion of the cases vulgarly, but probably correctly, called false conceptions, is of this kind; they seldom becoming the object of medical attention, owing to the little disturbance produced by them, either during their increase, or afterwards, as well as to the deception to which they give rise. Some of these cases may also consist of hydatids, or other morbid productions, which may be associated with hydrometra, as in cases recorded by Baudelocque, Boivin, Duges, and others. (See Ovaria, and Uterus.)

214. iv. Encysted Dropsy of the Peritoneum — *Extra-peritoneal Dropsy — Hydrops Peritonei* of Tulpius, and some other authors — consists of *the collection of water between the parietes of the abdomen and the peritoneum, enclosed in a cyst.* It was first noticed by Morgagni, and accurately described by Morand. Twenty-six cases of it have been adduced by Lieutaud, twenty-four of which occurred in females. It presents the same constitutional features as have been noticed in respect of encysted dropsies generally; and although, when the accumulation of fluid is very great, it can hardly be distinguished from ascites, excepting in its early stages, it may generally be suspected from the less uniform enlargement of the abdomen, the greater anterior prominence of this cavity, its much slower progress, and the less constitutional disturbance; the countenance and surface not presenting the cachectic appearances generally accompanying ascites, and the patient often retaining much vigour and activity of all the natural and animal functions. Still the *prognosis* in this disease is unfavourable. The sac generally continues to enlarge, and sometimes forms adhesions with the contiguous viscera; and if not evacuated, it eventually bursts into the cavity of the peritoneum, as in the cases recorded by Chomel (*Mém. de l'Acad. Roy. des Scien.* an. 1728.), Morgagni (*De Caus. et Sed.* ep. xxxviii. art. 51.), and Tavernier (Le Dran's *Obs.* 65.); or externally, as in those of Degner (*Acta Cur. &c.* vol. v. obs. 2.) and La Motte. M. Chantourelle met with a case wherein the sac opened into the intestines after a puncture had been made for the discharge of the fluid, and fæcal matters passed out at the external opening.

215. The *treatment* of this form of disease has not been satisfactorily illustrated. It seems not materially benefited by purgatives or diuretics; but it is stated, in some instances, to have been permanently removed by paracentesis. And cases have been adduced by Nuck, Degner, Le Dran, La Motte, and others, in proof of the propriety of the practice. But in cases of recovery from a disease of this description, there must still exist doubts of its nature. If puncture be resorted to when the tumour has reached a very large size, the opening should be valvular, and graduated pressure subsequently employed. The terrible effects occasioned by keeping open the orifice in order to drain the cavity, were fully demonstrated in M. Chantourelle's case, the cyst having become inflamed, and gangrenous with the adjoining parts; as well as in two interesting cases recently recorded by Mr. C. Hawkins.

216. v. Encysted Dropsy of the Liver is liable to be confounded with abscess of this organ, or with large accumulations of bile in the gall-bladder, from obstruction of its duct, or of the common duct. The cysts which are sometimes found in the substance of the organ, whether of a simple kind, or containing hydatids, are different from those encysted collections of fluid, which either form between the peritoneum and its proper covering, or are apparently attached merely to this viscus. These last evidently consist of hygromatous cysts developed on the adhering surface of the serous membrane, and reaching an uncommon size. When large cysts containing hydatids are formed near the surface of the liver, although essentially different from the simple cysts, and seldom reaching the same magnitude, they generally occasion similar symptoms, both local and constitutional, to those which attend the latter. In some instances, these cysts become inflamed; thereby occasioning great tenderness of the external surface, and changing the contained fluid to a sero-puriform matter, as well as increasing its quantity.

217. Encysted dropsy of the liver is generally accompanied with more disturbance of the general health than the other forms of encysted dropsy of the abdomen, and its progress is usually more rapid. Although a dangerous disease, recovery sometimes takes place from it. Cases terminating favourably have been recorded by several writers referred to in the *Bibliography*. This is most likely to occur if the cyst is attached to the anterior part of the surface of the organ. In this case, a large fluctuating tumour is commonly formed below the right false ribs, or near

the epigastric region, extending more or less downwards and in other directions, according to its size and situation. Inflammation may take place in the more prominent portion, and the cyst may discharge its contents through an external opening, either made artificially or occurring spontaneously. This latter termination, however, is rare; but it may be followed by recovery; two instances of which are adduced by M. Itard. More frequently the cyst opens into the abdominal cavity, or into some part of the alimentary canal, or even into the thorax; and in either case a fatal result generally ensues. In some instances the rupture of the cyst has been occasioned by external violence. The difficulty of distinguishing this state of disease from abscess of the liver pointing externally, or from distention of the gall-bladder, is always great, or nearly impossible. In both these latter cases, however, there are generally more or less jaundice, more constitutional disturbance or greater pain in the region of the liver, more disorder of the bowels, and more interruption to the biliary secretion, than in the encysted collection; the purulent formation being preceded by the usual signs of chronic hepatitis, and distinguished in the manner pointed out in another place. (See Liver — *Diseases of.*) Interesting cases of this form of encysted dropsy have been published by Mr. Brodie, Dr. Thomson, Dr. Thomas, Dr. Abercrombie, Dr. Hastings, and Mr. Cæsar Hawkins. In three of these cases, the early puncture of the tumour, before inflammation supervened, seemed to have been successful. But in nearly all the instances on record, where this operation was performed in a far advanced state of the disease, or when inflammation of the cyst was present, a fatal termination has occurred.

218. vi. Encysted Dropsy of the Kidney is sometimes observed as a consequence of obstruction of the ureter, the pelvis of the organ becoming distended, and the glandular substance either atrophied or absorbed as the accumulation of fluid and distension are increased. This is evidently the manner in which the largest collections of fluid are formed in the kidneys, and interesting cases of it are recorded by Bonetus (*Sepulchretum*, l. iii. sect. xvii. obs. 22.), and by Dr. Howison and Dr. J. Johnson (*Medico-Chirurg. Review*, vol. iii. p. 657.). In this state of disease there have been observed great irregularity in the appearances, and in the excretion of the urine. The abdomen has ben very much enlarged, chiefly towards the side of the diseased kidney, with obscure fluctuation and severe pain in the spine and lumbar region. Simple cysts may also be developed in the substance of the kidney, and contain a limpid or yellowish fluid. They are generally of small size, but occasionally they are found very large. Portal describes one which contained a pint of clear fluid; and M. Itard another, in which there were found two cysts, the larger of which was a foot in diameter. This communicated with the pelvis of the viscus, the structure of which was absorbed, and contained a fluid of a urinous odour and colour; and most probably originated, as in Drs. Johnson's and Howison's cases, in obstruction of the ureter. This species of encysted dropsy generally terminates unfavourably in a shorter time than, perhaps, any other, probably owing principally to the serious consequences always arising from an interruption to the urinary secretion. In an interesting case, which occurred to Dr. Seymour, and is described by Mr. C. Hawkins, a single cyst was found in the substance of the kidney, unconnected with its pelvis, and containing five pints of fluid, not possessing any urinous characters.

219. vii. *Encysted dropsies of the omentum, of the mesentery, and of the spleen*, are of rare occurrence, and can seldom be distinguished from some other diseases during the life of the patient. When fluid is found in the omentum, it is generally effused, or infiltrated between its laminæ. But simple cysts, containing a watery or serous fluid, of various sizes, are, in rare instances, found in these situations.

220. viii. Encysted Dropsy is very rarely seen *in the thoracic cavity*. Haller observed it between the pleura and intercostal muscles, this membrane having become so distended by the fluid as to occupy nearly all that cavity of the chest; the pericardium being also filled with water. Stoërck relates a case in which a female with consumptive symptoms experienced great difficulty in lying on the left side. On dissection, a large simple pellucid cyst, formed in the substance of the right lung, and containing eight pounds of a yellowish serum, was detected. Maloet found, in a person with all the symptoms of hydrothorax, and who was obliged always to sit up, a similar cyst, but not so large, in each lung; and the same productions have been observed by M. Dupuytren, in this situation, and in the pericardium.

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X. Dropsy in the Head. — Syn. *Dropsy in the Head and Brain ; Hydrocephalus ; Hydrocephalum ; Hydrocephale* (ὕδωρ, water, and κεφαλὴ, the head) ; Ὑδροκέφαλον, Ὑδροκέφαλος ; *Hydrops Capitis*, Auct. var. ; *Hydropisie du Cerveau, Hydrocéphale*, Fr. ; *Der Wasserkopf, Kopfwassersucht, Hirnwassersucht*, Germ. ; *Idrocephalo*, Ital. ; *Water in the Head.*

221. Defin.—*Sopor, with paralysis, anæsthesia, or convulsions, and often with slowly increasing size of the head, from a collection of watery fluid within the cranium.*

222. It is not my intention to notice the very rare and unimportant disease, called *external hydrocephalus.* My limits will be more profitably occupied with the consideration of the very common, dangerous, and somewhat imperfectly understood malady — internal hydrocephalus. *Dropsy within the head,* internal dropsy of the head, or water in the head, as it is usually designated, may be divided into — (*a*) *dropsy of the membranes,* and (*b*) *dropsy of the ventricles.* Either may occur singly, but both may exist in the same case, in various degrees. The former variety is much rarer than the other, and takes place usually to a much less extent. In it the water is contained in the general cavity of the arachnoid, and is in some instances a congenital disease, producing watery tumours, protruding through apertures in the cranium (§ 176.). The fluid is rarely effused in any considerable quantity between the arachnoid and pia mater, and still more rarely between the latter and the brain. In dropsy of the ventricles, which is the most common, and which Meckel designates the internal dropsy of the head, the water is collected in the bags of the arachnoid and vascular membranes, lining the internal cavities of the brain, and is contained in all or the greater number of these cavities in the same case.

223. Dropsy within the head is *idiopathic* or primary, and *symptomatic* or secondary, — more frequently the latter. It is also either *acute* or *chronic*, or of intermediate grades. It occasionally commences in an acute or sub-acute form, and insensibly and gradually passes into the chronic state. It is often congenital, — in which case it is usually chronic, or quickly becomes so ; and it occurs at all periods after birth, particularly during the earliest epochs, — when it is generally acute or sub-acute. These circumstances are important in respect of its nature and treatment.

224. Hydrocephalus cannot be said to have been known to the ancients ; this term having been applied by them chiefly to collections of fluid exterior to the cranium. Hippocrates, however, in speaking of the maladies which arise from the head, notices one which has a marked resemblance to the symptoms of the acute or sub-acute form of this disease ; and at the same time assigns water on the brain — ὕδωρ ἐπὶ τῷ ἐγκεφάλῳ, — as its cause (*De Morbis*, lib. ii. cap. 15. edit. *Vander Linden*, t. ii. p. 47.). From Hippocrates to Rhazes, no mention is made of internal hydrocephalus. But this latter writer states, in his book on the diseases of children, that the head sometimes acquires an increased bulk, owing to the collection of fluid within the cranium. The chronic form of this malady was described nearly a century before any notice was directed to its acute states ; but, during the last fifty years, these states have attracted attention great in proportion to their prevalence and fatality in the early stages of life.

i. Acute Dropsy in the Head. — Syn. *Hydrocephalus Acutus ; H. Acutus internus ; Hydrencephalus* (from ὕδωρ, water, and ἐγκεφάλος, the brain) ; *Febris Hydrocephalia ; Carus Hydrocephalus ; Apoplexia Hydrocephalica*, Cullen ; *Hydrencephalon*, Hufeland ; *Hydrops Cerebri Acutus ; Hydrocéphale aigu, Fièvre Cérébrale des Enfans*, Auct. Gall. ; *Hydrocéphalite*, Brachet.

225. Defin. — *Fever, with sopor headach, and morbid sensibility to light, &c. ; inability to bear the erect posture ; vomiting ; costiveness ; screaming ; dilated pupils ; squinting ; convulsions and paralysis.*

226. Lit. Hist.— Acute hydrencephalus, notwithstanding the remark of Hippocrates already referred to, was formerly confounded with cerebral fever, or fever with determination to the brain. A case, in which it is accurately described, but considered as one of fever merely, was published by Dr. St. Clair, in 1733, in the *Edin. Med. Essays and Observations*, vol. ii. p. 287. Mr. J. Paisley, of Glasgow, in the following year (in *Ibid.* vol. iii. p. 333.), recorded a case, with the *post mortem* examination, and first recognised it as a specific form of disease. It was not, however, until the appearance, in 1768, of Dr. Whytt's "*Observations on the Dropsy of the Brain,*" that the history of the malady and its nature were made subjects of investigation. The observations of Dr. Fothergill (*Med. Observ. and Inquir.* vol. iv.) contributed something to the knowledge of its symptoms; but those of Dr. Watson, in the same work, furnished evidence merely of its extreme danger. Dr. Dobson's case, published in 1775 (*Ibid.* vol. vi.), was valuable, inasmuch as it showed the possibility — at the time, very generally doubted — of curing the disease; and of the influence of mercury in bringing about this result. Harris, however, had long before stated, as Dr. Cheyne has remarked, that a physician of experience had saved children in fevers attended by unusual stupor, and even coma, by giving them *mercurius dulcis* six times sublimed.

227. The opinion of Whytt, that the disease depends upon laxity of the exhalants, or upon a watery state of the blood, had been generally received, until Dr. Quin, in 1779, maintained that it is allied to inflammation, — a doctrine which had suggested itself to both Dr. Withering and Dr. Rush, before Dr. Quin's views had become known. Dr. Withering stated explicitly, that the malady originates in inflammation, and that the water found in the ventricles of the brain is not its cause, but its consequence. Dr. Rush made an important addition to its history, by showing that it may be produced by other diseases, especially by fevers, rheumatism, pulmonary consumption, the exanthemata, and worms; and that death may supervene, preceded by hydrocephalic symptoms, and little or no water be found in the ventricles, — circumstances which will be fully enquired into in the sequel. Dr. Percival demonstrated its frequent connection with scrofula, and seemed impressed with the idea that it is not altogether identical with inflammation in its nature. Its inflammatory origin was afterwards supported by Dr. Patterson and Dr. Garnett, although neither appeared to consider it advisable to carry the depletory and antiphlogistic treatment so far as such a doctrine might have warranted. This last writer believed that, in hydrocephalus, a local inflammation without much general sthenic diathesis obtains; and that a depletory treatment, injudiciously employed, may weaken the general tone of the system, and increase the effusion, without materially diminishing the local morbid action, for the removal of which such means are employed. Of the justice of this view there can be no doubt. The local action, which has been called inflammatory, merely because it is attended by injection of blood-vessels, has been too generally treated as true inflammation occurring in a healthy constitution, and without reference either to the series of vessels affected, or to the grade, or the product of action; and, what is equally important, without regard also to the diathesis, or state of vital manifestation and power. It is unnecessary to notice here the opinions of more recent writers, as the chief of them are referred to in their proper places.

228. Descriptive History.—The *Precursory* or *Early Symptoms* of acute hydrocephalus are remarkably diversified, owing to the circumstance of their dependence upon disorder of the digestive organs, or of the circulation in the brain and membranes: and it is chiefly owing to the predominance of the symptoms referrible to one or other of these parts that the disease has been divided by some writers into the primary or idiopathic, and the secondary or symptomatic. The possibility, however, of making the distinction in practice is not so easy as some writers would make it appear. For the dependence of the functions of the liver, and digestive organs, upon the state of circulation in the encephalon, and of the latter on the former, is so very intimate, that it is often impossible to ascertain which is primarily affected. The majority of writers on the disease in this country consider that the digestive organs are the first to betray disorder; whilst the French pathologists and Dr. Abercrombie believe that the morbid action very frequently commences either primarily or simultaneously in the brain itself. I am convinced, that the true acute hydrocephalus originates more frequently in the encephalon, than the abdominal functions indicate, and at a period anterior to the disorder which these functions manifest, — such disorder often proceeding from the silent morbid action in the brain, reacting on it, and promoting the evolution of those changes constituting the disease; and that, when hydrocephalic symptoms supervene more suddenly and violently, and without much previous disorder of the chylopoietic viscera, or nervous system, they have a more intimate relation to acute or sub-acute inflammation of the brain and its membranes, than to those states of morbid action which terminate in copious effusion, and to which the term hydrocephalus is more strictly applicable. The chief exceptions to these inferences will be found in those who inherit a peculiar morbid diathesis or predisposition to the malady — who are scrofulous or weakly constituted, — and in these the brain and its membranes will often coetaneously suffer, in a greater or less degree, with one or more of the digestive organs; the excited action it experiences being either attended, or soon followed, by deficient power, and by relaxation of the exhaling surfaces. In these cases, as well as in those in which it is ushered in, or predisposed to, by derangements of the abdominal viscera, it does not, as in true cephalitis, readily occur in a previously healthy constitution, but chiefly in states of pre-existing ailment, or as a consequence of inflammatory action arising under such circumstances, — in which not only the chylopoietic viscera imperfectly perform their functions, but also the organic nervous system is weak, and the capillary vessels and exhalants are so deficient in tone as to be readily relaxed, or exhausted when over-excited. In other words, that acute hydrocephalus is a consequence of

disease, which originates variously; — in some it is the result or termination of inflammatory action occurring in a weak or morbid state of constitution, — in others of general febrile excitement, affecting patients similarly constituted, or occasioned by accumulated morbid secretions and excretions, or by local irritation; — that it stands in the same relation to inflammation as other acute dropsies; and, even when most inflammatory, that it differs from encephalitis much in the same way as phlegmon differs from erysipelas, or as acute peritonitis differs from the true puerperal fever. From what I have now stated, it will appear important to be acquainted with the symptoms indicating the pathological states terminating in acute hydrocephalus. These may be referred to two principal seats, viz. the *head* and the *abdomen*, but with the understanding that, in many instances, although the more distressing ailments seem to proceed from the one, the primary and principal disease may exist in the other.

229. FORMS AND STAGES OF THE DISEASE. — (*a*) The *Forms* have been chiefly referred to the mode of attack and symptoms of the first stage. Dr. CHEYNE has particularised three *varieties;* the gradual, the sudden and violent, and the secondary. These answer to the nervous, the inflammatory, and the consecutive, respectively, of HOPFENGÄRTNER and KUHN. GUERSENT divides the disease into the ataxic or febrile, and the apoplectic; ITARD, and several writers, into the idiopathic and symptomatic. M. BRACHET designates three forms; the nervous hydrocephalitis, the inflammatory, and the gastric; but it is very difficult to distinguish the nervous from the gastric form. GOELIS distinguishes merely the acute, and the hyper-acute or waterstroke. The division recommended by CHEYNE and HOPFENGÄRTNER is, upon the whole, the best; it matters but little how the forms are named. The terms, however, used by the German writers seem to be the least objectionable.— (*b*) Since the appearance of Dr. WHYTT's description, the disease has usually been divided into *periods* or *stages*. But much difference has existed as to the number of stages, and as to what symptoms indicate them. GOELIS points out four periods, viz. of turgescence, of inflammation, of effusion, and of palsy. WHYTT, QUIN, TISSOT, BAADER, SPRENGEL, CHEYNE, and others, mention three, according to the three different states of the circulating and nervous systems that obtain in the course of the malady. Some writers notice, with P. FRANK, RUSH, and CONRADI, only two stages; whilst FORMEY, VON PORTENSCHLAG, and GUERSENT describe none. This diversity depends chiefly on the irregular progress of the disease, its uncertain commencement, and the circumstances referrible to the constitution and previous health of the patient under which it occurs. I shall adopt the division, employed by Dr. CHEYNE and others, into — 1st, that of increased sensibility; 2d, that of diminished sensibility; and, 3d, that with palsy or convulsions.

230. *A. The Nervous form* is generally *preceded* by, or rather *commences* with, a great variety of symptoms, which continue a longer or shorter time before the disease is so fully developed as to be recognised, or as to excite the attention or alarm of the friends. For several days or weeks, or even for months, the child is vertiginous, liable to fall or stumble while at play or running about, is nervous, and starts or is fearful from slight causes, and more or less capricious in its appetite, or without appetite. The tongue is slightly furred, and white; the bowels are costive; the motions offensive, unnatural, clay-like, and indicating a morbid or deficient biliary secretion; the breath is fœtid; the urine is somewhat diminished in quantity; the complexion fades; the features collapse; the sleep is disturbed and dreamy; the eyes become heavy, very sensible to light, have a dark line under them, and lose their animation; the hypochondria and abdomen are often tender or tumid; and the child complains of occasional pains, which resemble rheumatism, in these regions, particularly in the region of the liver, and sometimes in the limbs. Various other symptoms are conjoined to, or supervene upon the foregoing, which continue frequently for a considerable time, without additional ailment, or confining the patient. But sooner or later they become aggravated; the surface assuming a harsh, sallow, or unhealthy aspect. The movements are now languid; the sleep more and more disturbed and unrefreshing, and the disposition to it often greater. Giddiness, slight pain or noise in the head, tenderness of the scalp, and pains in the neck and limbs, are complained of. The countenance is heavy; the sense of sight and hearing often very acute; and the pulse is quicker, and more excitable than natural. The child is drowsy, silent, or appears as if in a reverie, and indifferent to those persons and objects he was formerly interested in. He is also irritable, or dejected, sighs often, and yet frequently makes no complaint, when questioned. Purgative medicines usually procure scanty, clay-like, pale, or greenish and slimy evacuations. These symptoms are very frequently removed by active purgatives; and although they often run into those indicating unequivocal disease within the head, yet they indicate nothing beyond a general and grave disturbance of the functions. But when they persist after proper treatment, or are neglected, the *first stage* may be considered as being actually present, although it should be rather viewed as commencing with the first signs of ailment; more pathognomonic symptoms superpervening on the foregoing indefinite ailments. The above series of symptoms nearly agrees with the first period, or that of turgescence, of GOELIS.

231. (*a*) The pain in the head returns more frequently and acutely; and is often attended by severe ear-ach, by aching of the eyes, and more commonly by increased sensibility to light and noise, and alternate chills and flushes. The pulse is now quick, excitable, and of irregular strength and frequency. The gait is unsteady; the skin warm, dry, and unhealthy; the pains through the trunk and limbs more frequent and severe, and accompanied with sickness and vomiting, particularly on getting up in the morning. The tongue is loaded or furred. There is occasionally dragging of one leg, or a raising of the foot as if stepping over something in the way, or a painful crick in the neck. The stools, from being scanty, costive, and clay-like, pass to dark green, and a gelatinous or spinach-like state, exhale a sickly and peculiar smell, and are still

procured with difficulty, this change depending chiefly upon the morbid condition of the secretions poured into the digestive canal: the urine is scanty and turbid, and has often a milky appearance (ODIER, COINDET, and VIEUSSEUX). The erect posture or motion, particularly rotating the head, brings on sickness and retchings, without the appearance of offensive matters. There are also great fretfulness and restlessness; contracted pupils; frowning, or knitting of the brows; inability to sit up; a whining or moaning noise when lying down; and sometimes a slight cough, with irregular suspirious breathing. The sleep is short and restless; the infant rolls its head on the pillow, or often wakens with a scream or crying, and raises its hands to its head. The nostrils and lips are dry and cracked. This period is very variable in *duration*, but it usually continues from ten to fifteen days.

232. (*b*) *Second stage.*—The pulse, from being very quick, excitable, irregular, and weak, now becomes slower — sometimes as slow as natural, or even more so; but chiefly when the patient is in the horizontal position; for if he attempt to sit up, it generally acquires its former frequency. The sensibility is now remarkably impaired: sopor or stupor gradually supervenes, with dilated pupils, squinting, and imperfect or double vision. The eyes are dull, heavy, vacant, or staring; the eyelids drooping or half closed. Sickness or retchings are now less frequent, unless the child be raised up, when one or both often occur. The excretions are passed unconsciously, and are scanty, and procured with difficulty. The stupor is interrupted by exclamations, or shrill piercing screams; the hands, which are tremulous, being raised to the head or neck, or occupied in picking the lips or nostrils. Emaciation proceeds rapidly; but food is generally swallowed greedily when presented. These symptoms are, however, by no means uniform; for the pupil is frequently, particularly at first, oscillatory, or, although dilated, affected by light. The stupor, also, is not always constant; nor does the pulse always becomes slow. Deep inspirations, hectic flushings of the cheeks, cold extremities, low delirium, and an almost total suppression of urine, are occasionally observed. The *duration* of this period varies from four or five days to two weeks.

233. (*c*) *The third stage* has been generally recognised by the returning frequency of pulse, which is often remarkably rapid, thready, and weak; by the occurrence of general or partial convulsions; by paralysis of one side or limb; by twitching of one or more of the muscles; and by suffusion of the eyes, the eyelids being motionless, and the cornea becoming dim and filmy. Often, when one side is paralysed, the other is more or less convulsed. The patient is now either insensible or delirious. He rolls his head on the pillow, grinds his teeth, moves the unpalsied hand in the air, and moans or breathes heavily and hurriedly. Alternate flushings and pallor, or flushes of one cheek, the other being pale; irregular distribution of the circulation; partial sweats; cold extremities; irregular, or stertorous breathing; an eruption of vesicles about the mouth, or on the face and upper part of the chest (FORMEY, GOELIS, SCHMALZ, RAIMANN, and myself); collapse of the countenance; blueness or paleness of the lips; and, more rarely, sphacelating sores; are remarked towards the close of the disease. The dilatation of the pupil and strabismus generally continue throughout this stage, which may terminate fatally (generally in a violent convulsion) in a few hours, or it may last for ten or twelve days, or even longer. Such is the common course of the most frequent form of the disease, which comprises the *Nervous* and *Gastric* of BRACHET; and which may either originate in the encephalon, or in the digestive organs. But it is seldom that the early history of the case is so precise as to enable the physician to draw a correct inference as to its commencement. In some instances, I have observed slight symptoms of cerebral disease, for some weeks, or even months, after repeated attacks of congestion or of inflammatory action within the head, of a well marked character, but supposed to have been removed by treatment. In some of these cases, the disorder of the digestive organs was so evident as to give rise to the idea of the primary affection of these viscera, indicating the difficulty of ascertaining the parts first deranged. The information furnished, in most instances, seldom enables us to carry our pathological analysis sufficiently far back to connect the early ailments with their causes; and, consequently, we often fail in ascertaining the quarter where disease commences.

234. *B.* The *Inflammatory variety*, or the second form of DR. CHEYNE, of M. COINDET, and of HOPFENGÄRTNER, is more acute than the preceding. The *precursory* symptoms are generally of short duration, and sometimes so slight as to be overlooked. This variety nearly resembles fever, with predominant affection of the head; and in many cases it is not to be distinguished from inflammation of the brain and its membranes (see BRAIN, § 174. *et seq.*), the disease being merely a modification of inflammatory action, depending upon diathesis, and previous state of health; and, owing to these circumstances, giving rise to effusion. After the child has been drooping for a short time, fever, with slight, short, and irregular remissions, flushings, severe headachs, increased heat and sometimes soreness of the scalp, augmented sensibility, thirst, hot skin, brilliancy of the eyes, and tenderness over the abdomen, supervene; the pulse being rapid, hard, or small; and the tongue white or loaded. Stupor or unwillingness to be roused, alternating with violent screams, and complaints of the head and belly; great irritability of the stomach; retching readily brought on by changes of position or by sitting up; a morbid and scanty state of the alvine evacuations; a vacant, dejected, or heavy expression of the eyes; a pained and terrified look; and diminution of all the secretions and excretions; commonly characterise this form of the malady. This *first stage* is usually accompanied with many of the phenomena of the first period of the foregoing variety: the chief difference being in the more febrile condition of that now under consideration, in the earlier and more evident connection of the symptoms with the brain, and in the shorter continuance of this stage. As soon as the changes which attend the *second period, viz.* dilated pupils, strabismus, stupor, diminished frequency of pulse, &c., appear, the progress of this is in all respects the same as that of the first variety; the stages being

more distinctly marked, but frequently of shorter duration, than in it. This form is generally idiopathic, whilst the foregoing is often symptomatic of disease of the liver and digestive organs.

235. *C. The Consecutive variety* is observed in an advanced stage of some acute disease, or soon after its decline, assuming either of the foregoing forms. It may follow the disappearance of some scrofulous affection; in which case it generally presents the characters of the first variety. It may come on after scarlatina or measles, and early in hooping cough; and it then commonly makes its attack with all the violence of the second variety. When it appears during remitting fever, difficult dentition, and in the latter periods of pertussis, it often steals on so imperceptibly, as not to be recognised until dilated pupil, strabismus, convulsions or paralysis, and other symptoms of the advanced stages, are remarked. In such cases, the symptoms of the early period are liable to be confounded with those of the malady of which it is consecutive. Pain, which is one of the most prominent features of hydrocephalus, is sometimes but little felt in this form.

236. *Remarks.*—The varieties now pointed out can be recognised only during the first stage, and chiefly by the mode of *attack*, which, in the *first*, is always slow and insidious. This is the most frequent form of the disease. In the *second*, the attack is more sudden and tumultuous; its first stage lapsing into the second in from two to four or five days. This, however, is the least frequently observed in practice, and is hardly to be distinguished in its first stage from inflammation of the brain and its membranes, of which it is only a modification or termination, when affecting the more central and internal parts of the encephalon. It occurs in more healthy children than the other forms do, and is commonly idiopathic or primary. The *third* variety often proceeds not only insidiously, but rapidly; and is generally the most fatal. It may present very unequivocal inflammatory characters in some cases, particularly when it follows the exanthemata; and in others, neither the symptoms, nor the appearances upon dissection, of true inflammatory action, may be observed; as when it is consecutive of hooping cough, remittent fever, and other affections, chiefly referrible to the digestive organs. During the progress of all the forms of the malady, especially the first and third, the febrile symptoms are very irregular, and often only occasionally present. The thirst and appetite are also various; and the breathing is sometimes calm and soft, and, at others, laborious, quick, and suspirious. The circulation is at times irregularly distributed, the head being hot and the cheeks flushed, while the lower extremities are cold; and at other times it is more equable, the countenance being pale, the skin warm, and even perspirable throughout. The bowels are generally as already described; but, in some cases, a bilious purging attends the vomiting. In a few instances, after the delirium, insensibility, and convulsions in the last stage, a return of the senses and intellect has ushered in dissolution.

237. In *young infants*, hydrocephalus is ascertained with much difficulty, and is liable to be confounded with disorder of the digestive organs. The knitting of the brows, watchfulness, moaning, feverishness, the throwing back of the head, starting from sleep with a cry of alarm, frequent vomiting, aversion from light, the peculiar character of the stools, the half-closed eyelids, the full or distended fontanelle, and hanging or rolling of the head on the nurse's arms, are the chief symptoms. The expression of pain is not violent at this epoch; and there are not, in this disease, the drawing up and flinging out of the legs, with screaming and crying, as in colic or griping pains. It seldom, however, appears before the period of dentition; but, when it occurs about this period, it is often ushered in by convulsions, or convulsions appear at an earlier stage of the malady than in older children.

238. The *duration* of acute hydrocephalus is extremely various. When it has reached the second stage, its duration is very uncertain; for death may supervene in a few hours, or not until after two or three weeks. In young infants, it frequently advances most rapidly. Fothergill, Coindet, Sprengel, Cheyne, Goelis, &c. consider that it commonly runs its course within three weeks. Whytt, Frank, C. Smyth, Yeats, and others, believe that it may be protracted much beyond that period. The consecutive form may terminate in about a week; and the inflammatory seldom lasts longer than three weeks; but the first or nervous variety may continue for four, five, or even six weeks, or longer, if the earliest symptoms be taken into the account. In some instances, especially of the first form, the disease may assume a nearly chronic character, or a state intermediate between the acute and chronic, or may pass altogether into the latter, especially in young children; a slight separation of the sutures, enlargement of the head, sallowness, marasmus, palsy, &c. taking place; and a larger collection of fluid being found in the ventricles than in the more acute states, although less than in the congenital and chronic. The most common duration of the disease, according to my experience, is from two to four weeks. There is great difficulty, as respects the first and third forms particularly, in determining the period at which the malady giving rise to the effusion begins. As to the effusion itself, it may commence coetaneously with the second stage, or not until a subsequent period.

239. *Appearances on dissection* vary remarkably, even in cases belonging to the same form of the disease. — (*a*) In the *first form*, the veins of the membranes are generally found congested, with dark-coloured blood. In a few instances, I have observed inflammatory appearances in the longitudinal sinus; and a similar observation has been made by Bucholz. The ventricles usually contain from two to six or eight ounces of limpid serum. The substance of the brain is soft and blanched, especially towards the central parts; and in the vicinity of the ventricles it is often very much softened, the fornix and septum lucidum being more or less disorganised, and soft like curd. The choroid plexus is pale, sometimes granulated. The pituitary gland is occasionally infiltrated, or otherwise slightly altered (Morgagni and myself); a slight watery infiltration of the substance of the brain has also been noticed. Tubercular formations have been found in various situations within the cranium (Laennec, Merat, &c.). Several other slight lesions of the encephalon have been observed; but they are by no means constant, and may be viewed as merely contin-

gent changes. The *liver* is often inflamed, somewhat enlarged, and extensively adherent to the adjoining surfaces. Dr. Cheyne has remarked small white tubercles on the surface of this organ; and I have seen them in this and other parts of it, as well as in the *spleen*. The *mesenteric glands* are frequently enlarged, and contain caseous depositions. The *stomach* and *intestines* are sometimes inflamed, the latter constricted, and even intus-suscepted. The mucous follicles of the digestive canal are often enlarged.

240. (*b*) In the *second*, and in most of the *third*, forms of the disease, the brain and its membranes, particularly towards the base and central parts, present many of the usual appearances of inflammatory action, especially injection of the vessels, and thickening and opacity of the membranes, in addition to effusion of serum. The fluid is not so generally limited to the ventricles in these forms as in the first, is usually in less quantity in these cavities, but is effused also between the membranes, especially in the general cavity of the arachnoid, or between this membrane and the pia mater, elevating the former, and thereby exhibiting a gelatinous appearance. Bonet and Greding observed effusion between the cranium and dura mater; and Dr. Abercrombie thinks this not a rare occurrence, and that it is the source of the fluid which escapes upon opening the head. The *fluid* itself is much less limpid in these varieties, than in the first; it being often turbid, or whey-like, containing minute shreds of lymph, and presenting evident traces of albumen. In many of the cases belonging to the second form, the cerebral substance retains its consistence, its cut surface indicating increased vascularity. In some cases, the surface of the ventricles is covered by a fine film of lymph, which hardly adheres to it. In several instances of the disease consequent upon scarlatina, I have observed the effused fluid of a turbid, brownish, and sanguineous appearance.

241. *D.* Hyper-acute Hydrocephalus; *Apoplexia Hydrocephalica; Wasserschlag*, Germ.; *or Waterstroke.—The sudden effusion of water on the brain*, although noticed by some other writers, was first described by Goelis. He states that it may take place either idiopathically, or in consequence of various diseases. Although I have met with many cases of its consecutive occurrence, I have seen none that could be strictly called idiopathic. It most commonly appears in the advanced stages of the exanthemata, after the repulsion of chronic eruptions, as tinea capitis, crusta lactea, discharges from the ears; or after the arrest of habitual evacuations and excretions, as chronic diarrhœa, dysentery, the choleric fever of infants, habitual perspirations, &c., and when the powers of life are much reduced. In all such instances, it is to be considered merely as a more rapid form of the *third*, or consecutive, variety of hydrocephalus already described; taking place, in some instances, with surprising suddenness, and terminating fatally with great rapidity — sometimes in from twelve to twenty-four hours. The attack, under these circumstances, is seldom or ever recognised until the symptoms of the second or third stage of acute hydrocephalus supervene. Goelis supposes, from the appearances of vascular turgescence observed in some cases after death, that a degree of inflammatory action may suddenly supervene, and be coincident with effusion. But it is very rare that marked vascularity of the membranes and brain of children is not observed upon dissection, whatever may have been the disease of which they died. It is very probable that increased determination of the circulation has preceded, or accompanied, the effusion in these cases; but the vascularity is no proof of inflammation. The *effusion*, in the several instances of this kind that I have examined, was chiefly in the ventricles, although partly also between the membranes; was generally in less quantity than in the common acute disease, — in all the cases, under four ounces; was less turbid than stated by Goelis; and occurred in children who were of an unhealthy habit, lax fibre, and much reduced by disease.

242. *E.* Sub-acute Hydrocephalus. — This form of dropsy in the head, already alluded to, is deserving of more particular notice, from the frequency of its occurrence. I have met with it most commonly as a slighter grade of the *first variety* described above (§ 230.). It generally occurs between the second month and the commencement of the second year of age. After the continuance of many of the symptoms characterising the first stage of that form, the head begins to enlarge, with slight separation of the sutures, and imperfect developement of the symptoms of the second stage. In many cases, the disease is slighter, and the duration longer, than in the first form; but, in others, the symptoms are quite as severe for several days, when the yielding of the cranial parietes before the effused fluid seems to abate their violence. In some cases, the malady is prolonged merely for a few days; in other cases, for a much longer period, so that it runs into the *chronic*. In rare instances, recovery is slowly and insensibly established, the patient — especially if nature be judiciously assisted by art — outgrowing, as it were, the disease. During its progress, the symptoms vary but little in kind from those already described. The bowels are generally irregular after having been long torpid, and they sometimes become lax, the stools being mucous, unnatural, and offensive. In some instances, diarrhœa comes on during the advanced stages; and if this be not checked, and if the powers of life be supported or promoted, and appropriate remedies prescribed, recovery may take place. But more frequently the loss of flesh, general cachexia, disorder of the bowels, sopor, paralysis, &c. advance slowly, until convulsions or exhaustion terminate life.

243. *Dissections.*—In all the cases I have examined, the fluid effused was altogether in the ventricles, has exceeded eight ounces, and was either entirely or nearly limpid. The brain surrounding the ventricles was frequently softened; but, excepting a common injection of the membranes, there were no remarkable inflammatory appearances in the encephalon. A thin film of mucous lymph covered the surface of the ventricles in some instances. An increased quantity of fluid was occasionally found about the medulla oblongata, and in the spinal canal. The *liver* was often more or less inflamed or enlarged, the digestive mucous surface also inflamed in various parts, and Peyer's glands were enlarged — in some cases ulcerated. The mesenteric glands were frequently diseased in the manner stated above (§ 239.).

244. Diagnosis.—Although the disease is readily ascertained in its far advanced stages, when it is nearly or wholly beyond the reach of medical aid, it by no means admits of easy recognition at an earlier period. Indeed, as will be hereafter shown, the effusion being often an occurrence contingent on a variety of ailments, and often arising out of a morbid condition of the system, and of the parts contained within the cranium, no early diagnosis can be formed; for the functional disturbances and general febrile commotion characterising the commencement of the disease, are readily removed in many instances, whilst, in others, apparently as slight, or even slighter, the symptoms commonly attributed to the effusion will rapidly supervene, notwithstanding the most judicious treatment: and, after all, it remains very questionable, whether or not the symptoms commonly attributed to the effusion are not rather the results of the changes which have taken place in the organic nervous influence, in the circulation, and in the structure of the brain, upon which changes the effusion is merely contingent, than the consequences of the effusion itself; for I have observed, in several cases, as much fluid effused within the cranium, there having been no hydrocephalic symptoms during life, as in the most marked form of the disease. We have, moreover, seen that, in many of the cases of inflammation of the brain, or of its membranes (see Brain, § 175.), very nearly the same train of symptoms appear as in acute hydrocephalus, and yet little or no effusion takes place; and that, in the more inflammatory variety of this malady, where the symptoms characterising the advanced stages are most marked and uniform, the quantity of the fluid effused is generally the least. Where, however, we see a child in a state of insensibility, rolling his head upon the pillow, frequently grinding his teeth, screaming acutely, moving one hand in the air, while the other is palsied, with a hectic on the cheek, drooping eyelids, heavy vacant stare or strabismus, dull filmy cornea, dilatation of the pupils, collapsed features, general emaciation, partial sweats, suspirious, laborious, or rapid breathing, and convulsions, after having been ailing for some time, and more recently affected by febrile action, with marked disorder of the digestive organs and of the head, it may be inferred that effusion has taken place within the ventricles, and at the base of the brain, chiefly in the former; but of this there is no complete certainty, for very nearly the same phenomena may arise from extensive encephalitis, or from inflammatory softening of the brain, at their most advanced stages.

245. (*a*) I have already stated that the disease, in its inflammatory form, is nearly related to *inflammation of the brain and its membranes*; and I may now add, that, in the first form described, it is often equally closely connected with *softening of the organ* (see Brain, § 214.). In many cases, the distinction is made with great difficulty, and in some it is not to be made at all; for the effusion is, in such, merely one of several coexistent changes either immediately consequent upon, or more remotely following, the inflammatory act in the former class of cases, and the softening in the latter. When, however, any diagnosis can be established by the close and experienced observer, it is most important to be guided by it. The turgescence, which attends inflammation of the brain, often gives rise to symptoms which nearly resemble those produced by watery effusion: and it is only by estimating the history of the case in connection with the causes and a number of existing phenomena, that an opinion can be formed as to the exact state of disease. — *α. Encephalitis* occurs more frequently in previously healthy children; its attack is sudden, and the progress of its early stage rapid and tumultuous: *hydrocephalus* appears in the unhealthy; and consecutively either of previous attacks of congestion or inflammation of the brain, or of disease of the digestive and chylopoietic viscera,— generally in a gradual, slow, or insidious manner: the former being commonly an idiopathic, the latter often a symptomatic disease. — *β*. In *encephalitis*, pain is constant and throbbing, increased by any excitation of the circulation, frequently preceded, or attended, or followed, by distinct chills or rigors: in *hydrocephalus*, pain is intermittent or remittent, shoots with great violence, occasioning anguishing screams, wants the pulsating character, is not increased by what excites the circulation, often alternates with pains in the abdomen, and is seldom attended by chills or rigors. — *γ*. The sickness and vomiting, symptomatic of the former, are unaccompanied by the fulness and tenderness of the hypochondria and epigastrium which commonly precede and attend these symptoms in the latter malady. — *δ*. The countenance in *encephalitis* is tumid and injected, the features enlarged, the attendant fever of a sthenic or phlogistic character, and its progress very acute: in *hydrocephalus*, particularly its first and most common form, the countenance is not very sensibly tumid; the cheeks only are irregularly flushed; the thirst is not so great, nor the anorexia so complete; the febrile heat is not so high, so general, or so constant; the surface is not so full and animated, nor is the pulse so steady and strong as in the former disease. The pulse is more excitable, irregular in strength and frequency, in the respective stages; more rapid and weak at the commencement, and partakes more of the asthenic character, in the latter malady; the emaciation is also greater and more rapid. — *ε*. The stools in *encephalitis* are devoid of the peculiar characters they present in acute *hydrocephalus;* they are not of the same dark greenish colour, have not the gelatinous consistence, with the oiliness and glossy appearance, of those in the latter; nor do they possess the peculiar sickly, but not fœtid smell. — *ζ*. The contractions and spasms of particular limbs and muscles, often observed in *encephalitis*, are seldom met with in *hydrocephalus*; whilst, in the latter, paralysis is more common. From the circumstance of inflammatory appearances in the membranes, as well as of softening in the central parts of the brain, having been often found in hydrocephalic cases, in addition to the effusion of fluid, it may be legitimately inferred, that the disease will often partake more or less of the symptoms usually caused by these lesions (see Brain, §§ 146 — 182. 214. *et seq.*); and that cases will occur but slightly modified in their characters from those consisting of inflammation on the one hand, and of softening on the other; the former commencing suddenly and acutely, the latter slowly and insidiously.

246. (*b*) Acute hydrocephalus may be distinguished from *fever*, by the somnolency, knitting of the brows, the great irritability of the stomach, which is increased by motion and the erect posture; by the raising of the hands to the head, the throwing back the neck, the excitability and irregularity of the pulse, the peculiar character of the evacuations, and obstinate costiveness; by the pains shooting in various parts, and the overpowering headach which admits not of the head being raised, — the pain darting at intervals through the centre of the brain, and not throbbing as in phlogosis, nor being increased or brought on by excited circulation; and by the starting, peculiar scream, and the expression of anguish when the child is awakened by it from the constant dozing, into which he instantly afterwards falls. — α. The infantile *remittent fever* is distinguished from this disease by the absence of the above symptoms, by the expression, by the regular morning remissions, and by the feculent, brown, and more easily procured evacuations.— β. *Typhoid* or *adynamic fever* is rare in children, and is to be distinguished from this malady, by the more equable pulse, by the dark and fœtid stools and diarrhœa, low muttering delirium, supine posture, tumid abdomen, sometimes by petechiæ; by the dark brown, tough sordes on the teeth and gums; by the slipping down in bed; and by the absence of acute pains, convulsions, paralysis, and of the other remarkable symptoms of hydrocephalus. — γ. The *febrile disorders* produced by *worms* are generally more protracted than this disease; are without distinct stages, but with manifest remissions,—the sleep being sound, and pulse uniformly quick. In worm fever, the pains in the head and abdomen are dull and not much complained of; the appetite is ravenous, the stools spontaneous and copious, the urine abundant and pale, the perspiration free, the cheeks generally pallid, the sight and hearing are unaltered, the mouth and nose moist, the abdomen is constantly tumid, and the body but little or not at all emaciated; and if convulsions occur, they are not followed by paralysis. It should not be overlooked, that either of these states of fever may give rise to aqueous effusion on the brain, the early symptoms proceeding insidiously, or being masked by the primary disease, and thus often escaping detection until some of the characteristic symptoms of hydrocephalus supervene.

247. (*c*) Various *organic lesions* within the head may occasion very nearly the same series of morbid phenomena as constitute this disease; but generally they are of much longer duration, and are not attended by so much emaciation, or such overpowering pain in the head. The stages of the malady are not so well marked. Rarely, however, do organic changes occur in the encephalon or its membranes, in children, without the effusion of more or less fluid.

248. (*d*) The strangulating or crowing inspiration, with purple complexion, not followed by cough (see Larynx — *Spasm of*), but often accompanied by clenching of the hand on the thumb, with spasms of the toes, has been considered by many as connected with acute hydrocephalus. Without denying that this affection may occur as a symptom at an early stage of the disease, it should be recollected that it often disappears after scarifying the gums, or cutting the teeth, or removing morbid secretions. The *convulsions* attendant on hydrocephalus are generally characterised, as Dr. Cheyne justly remarks, by a greater affection of one side of the body than of the other: one arm or leg is, with some regularity, retracted and flung out, while the other is affected with spasmodic catchings; the eyes are suffused; there is often a circumscribed flush on the cheeks, and the breathing is slow, or irregular and sobbing.

249. (*e*) *Exhaustion of vital power* may occasion symptoms often closely resembling acute hydrocephalus. The circumstance of exhaustion giving rise to hydrocephalic symptoms — in some cases without any effusion, in others with the collection of more or less fluid — has been well known to me, and acted upon in my practice at the Infirmary for Children for many years. It was first very imperfectly alluded to by Dr. Cheyne; and subsequently by Dr. Abercrombie, Dr. Gooch, Dr. Darwall, and others, who appear not to have clearly understood it. These writers consider this consecutive affection as one of exhaustion of nervous power only: but I infer that something approaching to hydrocephalic is occasionally connected with it; for the benefit afforded by nutrients, stimulants, or tonics, is no proof that the exhaustion has not been attended by some degree of effusion. Indeed, the physical condition of the brain renders it most probable that some fluid is collected, owing to exhaustion, diminished nutrition, and the state of the cerebral circulation; and that it is absorbed as the pathological states that occasioned its effusion are removed by appropriate treatment. The appearances observed in the fatal cases fully confirm this view. I am at this time attending two cases of this affection that fully illustrate its nature. It is generally consequent upon weaning, improper or imperfect feeding, protracted diarrhœa, and exhausting treatment; and is usually attended by loss of flesh, increased sensibility and irritability, a feeble quick pulse, transient and irregular flushings, quick breathing, sometimes sighing or moaning, a white loaded tongue, scanty urine, and a mucous diarrhœa, — the evacuations being flatulent, unnatural, greenish, or gelatinous. Sometimes there is increased heat of the head towards night, but seldom any pain or screaming. In addition to evidence of pre-existing or attendant irritation of the digestive mucous surface, the bronchial lining, also, often indicates irritation by a dry hacking cough. This first, or *irritative stage* of the complaint is followed by one of more marked exhaustion, with stupor or torpor, particularly if the causes continue in operation. The pupils become dilated; the eyes vacant, and sunk in their sockets; the eyelids half shut; the countenance pale and cool; and the extremities, especially the lower, cold. If the complaint occurs during dentition, sometimes squinting, with partial convulsions, or with crowing or croupy inspirations; slow, irregular, or suspirious breathing; clenching of the hands, or spasms of the fingers and toes; are observed. The feet and legs are always cold, and with difficulty kept warm, especially if the head be hot. The fontanelle is sometimes depressed, or nearly natural. The pulse seldom or never loses its frequency. This torpid stage may terminate fatally with increased coma, a rattling respiration, sink-

ing and disappearance of the pulse, and profound exhaustion. Convulsions occasionally occur, but at no particular period of the complaint. A favourable issue frequently follows an appropriate treatment. In some of the cases which have ended fatally, I have found, on *dissection*, more or less fluid in the ventricles. The membranes were even less vascular than commonly observed in young subjects. In these cases, death is more to be imputed to disease in other viscera, and the attendant exhaustion, than to any change within the head.

250. (*f*) When acute hydrocephalus is consecutive of scarlatina, measles, small-pox, &c., it becomes important to detect it as early as possible. These diseases may terminate fatally, in their latter stages, copious effusion having taken place in the ventricles, and between the membranes of the brain; or the symptoms of this malady may not commence until a few days or even weeks after they have disappeared, more particularly after scarlatina. Severe and frequently recurring pain in the head at this period should always receive attention; and when this is attended with other symptoms of the first and second stages, decided measures should be adopted. When it follows scarlet fever, the occurrence of headach, stupor, or convulsions, either with or consequent on anasarca, may be viewed as evidence of approaching or commencing effusion in the head, which may be averted by antiphlogistic and other appropriate remedies.

251. PROGNOSIS.—This disease is not now so fatal as it was viewed by the first writers on it. If recognised early, a large proportion of cases will recover; even in the most advanced periods, the patient should not be despaired of. I have repeatedly seen recoveries take place, although strabismus, paralysis, convulsions, blindness, unconscious evacuations, and other unfavourable symptoms, had existed some time. Data furnished by the writings of ODIER, CHEYNE, MILLS, BRICHETEAU, GOELIS, and others, show that from a sixth to a third of the cases has recovered. But a perusal of the cases they have adduced, has convinced me, that some of those which recovered, as well as of those that died, belonged to acute or sub-acute encephalitis — little or no effusion having taken place — several of them presenting, on dissection, this as the least important change; the fluid sometimes amounting only to two or three drachms, — a quantity not nearly sufficient to warrant the designation given to the disease.

252. Although the prognosis should always be given with much caution, and be generally unfavourable; yet in few circumstances, indeed, ought the anticipation of such a result to paralyse our treatment. Dr. CHEYNE justly observes that, whilst the pulse continues steady, and the breathing natural, the most alarming symptoms should not prevent the use of active remedies. I would even go beyond this, and say, that the supervention of hurried breathing is the only symptom that should lead us to despair of the case. We should be cautious not to be misled by the falling in the frequency of the pulse in the second stage; and not to be induced to give a favourable prognosis from this circumstance. The coming down of the pulse should, therefore, be viewed in connection with the state of the eyes, and of the evacuations, and with the other symptoms, before any opinion should be formed from it. More copious and more readily procured bilious stools, and their more feculent appearance and natural smell, an increased flow of urine, mucous or watery discharges from the nose, and an abundant warm perspiration, are favourable signs. The occurrence of the disease in comparatively sound constitutions, in an inflammatory form, or after scarlatina, admits of greater hopes of recovery. This opinion is accordant with that of GOELIS and ABERCROMBIE, although it is different from that expressed by Dr. CHEYNE. The idea of effusion in the head being necessarily fatal, has operated unfavourably in the treatment of the disease. I believe, from extensive and attentive observation, that, notwithstanding the uncertainty of the existence of this change, it may be removed, when the powers of the constitution are not sunk too low.

253. When hydrocephalus follows protracted ill health, in scrofulous constitutions, in families where others have died of it, after remitting states of fever, during protracted convalescence, or when it steals on so as not to be recognised until it is far advanced, an unfavourable opinion of the result may be entertained. The breaking out of a vesicular eruption about the lips and face; total insensibility of the retina; great rapidity, smallness, and feebleness of pulse; dryness of the mouth, lips, and nostrils; boring of the finger in the ears; hurried respiration, and partial sweats, particularly on the neck and back of the head; indicate approaching dissolution. Even when the treatment is followed by very striking amendment, we have no certainty of the recovery of the patient; for most of the unfavourable symptoms have been removed; but, in one or two days, they have recurred, and death ensued. Even when an improvement has become more permanent, we cannot be sure of the result, until the actions of the iris return, and the alvine excretions, and other functions, become natural, — until then, a cautious opinion of the issue should be given.

254. CAUSES.—(*a*) The *predisposing causes*.—GOELIS and several others suppose that the disease is more common now than formerly, owing to the less frequency of eruptions on the heads of children. He also believes, and refers to facts in support of the opinion, that terror and anxiety in the mother during the last months of pregnancy predispose to it, — the disease often appearing in the child soon after birth. The *epochs of infancy and childhood* are, however, the most remarkable predisposing causes. At these periods, the rapid developement of the encephalon, and the great susceptibility of the nervous system, dispose the cerebral circulation to frequent excitement; and in proportion as the cerebro-spinal system acquires a predominancy in capacity and function over other parts, is the predisposition to vascular determination, to inflammatory action, to increased exhalation of serum, and other disorders of the cerebral vessels, augmented. The more frequent occurrence of the disease, often in an inflammatory form, in children with precocious intellects and large heads, is a common observation, and is confirmed by the experience of GARDIEN, HOPFENGÄRTNER, GUERSENT, and others. The more usual period of attack is from the first to the eighth year; its frequency dimin-

ishing as we depart from this epoch, down to the period of birth on the one hand, and up to puberty and manhood on the other. I believe, that, previous to the tenth year, the disease is most frequent in boys. Dr. CHEYNE thinks, with LUDWIG, that, after ten, girls are more subject to it. A *scrofulous diathesis* is also one of the most remarkable predisposing causes,—sometimes several children being carried off in a family where it exists. CHEYNE, SPRENGEL, and others, consider that hydrocephalus and scrofula are convertible into each other. That the former sometimes follows the disappearance of other scrofulous affection, admits not of doubt; but it rarely happens that the latter is influential in the removal of the former; indeed, effusion on the brain much more frequently proceeds simultaneously with tubercular and other strumous diseases in other parts of the body.

255. *Hereditary disposition* has also been viewed as a cause by QUIN, ODIER, FORMEY, P. FRANK, PORTENSCHLAG, BAADER, GOELIS, &c.; some, however, with CHEYNE, imputing such disposition to the scrofulous diathesis. But I have repeatedly remarked the hereditary tendency, without its dependence on scrofula. GOELIS, BRACHET, COINDET, and GIRTANNER ascribe this disposition to a peculiar connate irritability of the nervous system; this, however, does not advance the question much further. The children of parents addicted to drunkenness, particularly if the mother be given to the use of spirituous liquors during suckling, are also, according to my experience, prone to be attacked. In addition to these, may be enumerated a syphilitic taint of the parents (THOM); frequent congestions in the head, however induced; the use of too stimulating food and drink in early age; keeping the head too warm; the premature and excessive exercise of the senses and of the intellects; violent mental emotions, as terror, anxiety, anger, fear; the exhibition of anodynes to the child by nurses, or in the treatment of other diseases; repeated falls; injuries during parturition (STOLL, ARANTIUS, GOELIS); rocking in cradles (BLANCARD, *Anat. Prat.* c.i. obs.18.); the early and repeated application of cold to the head or other parts (PERCIVAL); concussions of the body; too frequent motion and depending positions of the head; whirling round on the toes; the injudicious use of emetics; the continued irritation of worms in the prima via, and of dentition during both the second and first periods; congestions, inflammations, and enlargements of the liver and and spleen; previous attacks of encephalitis, or of cerebral congestion; interruptions to the secretion and discharge of the bile; disorders of the stomach and bowels; enlargement and obstruction of the mesenteric glands; long continued costiveness; remittent and exanthematous fevers; pertussis; previous diseases imperfectly cured; and affections much disordering the respiratory functions. Dr. THOMPSON, of Jamaica, observed it frequently consequent on worms in the dark races.

256. (*b*) The *exciting causes* are, cold to the head of young infants; external injuries from falls, blows, &c.; concussions or agitations of the brain, from jumping, whirling, or depending positions of the head; the suppression of eruptions on the scalp, and behind the ears (CONRADI, GOELIS, &c.); the extension of inflammation from the ear (ITARD, LALLEMAND, &c.); the retrocession of acute eruptions, and suppression of chronic evacuations or discharges; the extension of irritation to the membranes or brain, from inflammations of the organs of sense, from the throat, scalp, face, &c., and from erysipelas of those parts; too copious general depletions in the exanthemata and acute diseases, in relation to the form of the malady and strength of the patient; the too liberal use of narcotics in young children, or their employment too early in several diseases, particularly in hooping cough, spasmodic croup, spasm of the larynx, and flatulent colic; whirling, tossing, or rudely rocking children in order to quiet them, when crying from disorders of the digestive organs, or erethysm or irritation of the encephalon; insolation; the early use of fermented liquors; carrying heavy loads on the head (J. JOHNSON); allowing children to sit on stones or other cold seats; and the metastasis of various maladies. RUSH, LETTSOM, GOELIS, and COINDET mention its occurrence from metastasis of rheumatism. I have seen this take place in a grown-up person,—the effusion being chiefly between the membranes,—but not in children; although I have met with metastasis to the heart in many cases of children—in one case now under treatment, which is the second in the same family. (See also BRAIN, §§ 182, 183.)

257. PATHOLOGICAL OPINIONS.—Acute hydrocephalus has been generally classed as a dropsical disease, although its claims to be thus arranged are somewhat equivocal. Its similarity, however, to other acute dropsies, particularly those of the chest, is most striking. Indeed, it seems to hold such a relation to inflammation on the one hand, and to chronic dropsy on the other, as to entitle it to be viewed as an intermediate disease, and as identical in most cases with other acute dropsies; in some instances approximating more nearly to the one than to the other. WHYTT considered it as altogether a dropsical malady; and Dr. CULLEN, in designating it apoplexia hydrocephalica, did not seem to entertain a very different opinion. PINEL fell into the same views, after having described it as a species of cerebral fever; which was the idea conceived of it by Dr. MACBRIDE. Contemporary with, and subsequent to, the appearance of Dr. QUIN's work, numerous authors, particularly RUSH, RAND, WITHERING, WHITE, ACKERMANN, GARNETT, MARTINI, HEINECKEN, GARDIEN, GOELIS, and RAIMANN, treated it as inflammatory in its origin; and a number of French pathologists, especially MARTINET and PARENT-DUCHÂTELET, have viewed it as arachnitis of the ventricles and base of the brain. Others, again, have supposed, with LALLEMAND and ABERCROMBIE, from the frequency of disorganisation of the cerebral structure in the vicinity of the ventricles, that it is a consequence of inflammatory softening or cerebritis; the disease either commencing in, or extending to, the arachnoid of the ventricles. ROSTAN (*Clin. Méd.* t. ii. p. 321.) has stated it to be a result of inflammation or other lesions of the brain and membranes, and seldom or never an essential disease. This is doubtless the case, if we consider all sensible lesions as sequences of anterior changes; but when the nature of the early changes cannot be readily inferred from the alterations they induce, we must be contented

to grapple with the obvious malady, until we know more of its antecedent pathological states. If we adopt the views of M. ROSTAN, no changes, excepting those immediately consequent upon remote causes, will be considered essential.

258. Several writers, observing the history and lesions of hydrocephalus to differ in several respects from inflammation, yet still to resemble it very closely, have viewed it as a peculiar form of inflammatory action affecting the more interior surfaces and substance of the brain. Thus, CONRADI termed it *Encephalitis exudatoria infantilis;* BRACHET, *Hydrocéphalite*, or watery inflammation of the brain; and COINDET, *Céphalite interne hydrencéphalite.* Other writers, particularly ABERNETHY, CURRY, CHEYNE, YEATS, THOMSON, &c., have considered it as most commonly proceeding from disease in the digestive organs, and seldom arising from primary inflammatory action in the brain or its membranes. This opinion has been carried too far; for I have often had evidence to convince me, that morbid action had been proceeding in the brain long before it was suspected, and that one of its chief effects was to disorder the liver and digestive canal; this sympathetic disorder being frequently considered as primary, and its reaction on the brain as the sympathetic production of hydrocephalus. I believe that the malady often originates in the substance of the brain; and that, conformably with what is observed in respect of lesions of this structure, the digestive viscera, frequently at one time the most remarkably deranged, are merely sympathetically affected. FORMEY and Dr. SHEARMAN have viewed the effusion as a consequence of simple excitement of the cerebral circulation, entirely independent of inflammation. The latter writer has considered it to be contingent on various diseases, and to arise from a diversity of causes; but that its occurrence is chiefly owing to the predisposition or previous state of the membranes, — the essential character of the disease consisting in that previous state or predisposition which, in connection with an excited state of the circulation, gives rise to increased exhalation or effusion. Dr. C. SMYTH has argued against inflammation, and in favour of debility, as the cause of the effusion; but whilst he has strenuously contended for the latter pathological condition as respects the tone of the extreme vessels, he has admitted the existence of accelerated circulation, and its influence in producing the disease. There is one inference, however, in which nearly all modern pathologists agree, viz., that the effusion itself does not constitute the malady, but is only its consequence, — contributing to the production of the more advanced symptoms, but in a less degree than many suppose.

259. *Pathological Inferences.*—(*a*) The *first* or *nervous form* of acute hydrocephalus is frequently consequent upon changes in the substance of the brain, in the membranes lining the ventricles, and in the vessels and circulation of the encephalon, probably arising from the state of the organic nervous influence supplied to this quarter, and to the perversion of the vital actions. (See DISEASE, § 87—92.) — (*b*) That these changes often commence gradually, or almost imperceptibly, and proceed far before they disorder the functions, either of organic or of animal life, in a remarkable degree; and when such disorder becomes manifest, it is often difficult to trace the quarter in which it has originated, owing to the intimate dependence of both classes of functions upon the organic nervous system. — (*c*) That the changes observed on dissection in this variety have evidently been in progress a considerable time before effusion has taken place; the effusion being the consequence of these changes, assisted by the physical condition of the encephalon. — (*d*) That nervous, as well as inflammatory and consecutive, hydrocephalus being merely contingent upon lesions of the organic nervous influence, of the circulation, and of the substance and membranes of the brain, such lesions actually constitute the disease during its early periods. — (*e*) That the nature of the cerebral affection, and the exact state of vascular action, in these periods, are not manifest: but if it be at all inflammatory — which admits of dispute — the vascular action possesses more of an asthenic or ataxic, than of a sthenic, character; or is attended by a perverted, rather than by a dynamic, state of vital power; and by imperfect performance of the digestive and assimilating functions. — (*f*) That, although the *first form* of the disease be consecutive of changes in the circulation, or in the organic nervous influence of the brain, the resulting phenomena may be such as to be mistaken for the exciting causes; the organs of locomotion may be so enfeebled as to occasion falls, which will aggravate the primary affection, and develope a state of sub-inflammation, or of vascular reaction in the encephalon, and its usual consequences, viz. determination of blood, injection of vessels, and effusion of serous fluid; or the viscera of digestion and sanguifaction may become so congested, or otherwise disordered, as to appear the parts primarily affected. — (*g*) That when this form is coincident with, or consecutive of, congestion, inflammation, or other disorders of the digestive and chylopoietic viscera, effusion into the ventricles cannot be viewed as the earliest changes that take place within the head; but that this effusion is merely consequent upon similar changes to those which have been already alluded to (*d*, *e*); the lesions in the digestive organs, as well as the earlier alterations in the brain, being, very probably, coetaneous results of pre-existing disorder of the system, or of constitutional vice. — (*h*) In whatever quarter disorder commences, it is probable that, sometimes at least, the sensorial power becomes exhausted, possibly coetaneously with the supervention of the second stage, and the cerebral tissue itself more or less wasted; but it is difficult to say whether this wasting be the consequence, or the cause, of the effusion into the ventricles,— possibly the latter. — (*i*) That, in the early stage of the disease, as well as in its progress, the vascular excitement, or febrile disturbance, attending it, is characterised by general adynamia or perversion of vital power. — (*k*) That great cerebral excitement does not necessarily imply the existence of inflammatory action in the encephalon; for accelerated circulation in a weakened state of the frame, and susceptible condition of the sensorium and nervous system generally, will produce cerebral excitement, particularly towards the close of febrile or protracted diseases; but this, instead of being inflammation, is a state very different from, or sometimes even opposed to, it, as shown by the *lædentia* and *juvantia*, and by

the *post mortem* appearances. — (*l*) In the *second form*, and in many of the *third*, particularly as occurring after the exanthemata, the symptoms, as well as the appearances after death, are more manifestly inflammatory; cases varying in grade from such as are described in the article BRAIN (§ 174.), until the characters of the nervous form of the disease are nearly approached; the inflammation differing in kind accordingly from sthenic inflammation, owing to the diathesis and the state of vital power. — (*m*) That the *waterstroke* or *hyper-acute* disease, in every case in which I have observed it, has arisen independently of inflammation, although generally consequently upon determination to, or congestion in, the head. — (*n*) That hydrocephalus, particularly its nervous form, may assume intermediate states or grades between the acute and chronic, which grades may be denominated *sub-acute*. — (*o*) That the disease may, in some instances, commence in an acute or sub-acute form, and become *chronic*, especially in infants whose cranial sutures have not closed. — (*p*) In some cases, also, the acute or sub-acute may supervene on the chronic state. — (*q*) That acute dropsy in the ventricles, although most common previously to puberty, may occur at any subsequent period, especially during the decline of life, and in old age. — (*r*) That it is, in such circumstances, generally attended by inflammatory appearances in, or softening adjoining, the surface of the ventricles; but it sometimes is unattended by any of these lesions. — (*s*) That in these cases it often terminates fatally in a short time, with apoplectic or comatose symptoms; constituting the *Serous Apoplexy* of authors, which is sometimes consequent upon other forms of dropsy in persons advanced in life; they being cut off by the effusion into the ventricles, without any other material change within the head, — the coma, or apoplexy, gradually becoming more and more complete until life is extinguished.*

260. TREATMENT. — *Lit. Hist. of.* — The opinion of Dr. WHYTT, as to the nature of acute hydrocephalus, and which was for a time very generally adopted, led to an inefficient treatment. Dr. WATSON, who adduced one of the first successful cases, trusted chiefly to blisters, purgatives, means to lower the attendant fever, and to the powers of the constitution for a cure. Drs. HAYGARTH and DOBSON were the first to prescribe mercury in the disease, particularly calomel, — a medicine which had been very largely employed about a century before, but had fallen into disuse; and which, having proved extremely efficacious in many of the maladies incidental to Europeans in the East Indies, was then finding its way, through means chiefly of Dr. LYSONS, Dr. HAMILTON, and Dr. CLARKE, into the practice of this country. Dr. DOBSON exhibited mercury with the intention of thereby increasing the function of absorption; and Dr. HAYGARTH, in order to induce salivation, with the expectation that, by procuring an aqueous evacuation from the neighbourhood, it might be the means of removing the fluid accumulated in the ventricles. Drs. A. DAWSON, SIMMONS, and WHITE placed their chief reliance on blisters and opium, — means which, in the present state of our knowledge, amount merely to useful adjuvants. The views of Drs. QUIN, WITHERING, and RUSH caused a revolution in the treatment of acute hydrocephalus. Dr. QUIN, observing in dissection, evidences of inflammatory action in the membranes of the brain, advised bloodletting, and cold applications to the head, in the first stage, and mercury afterwards; Dr. WITHERING used digitalis, but his cases were not sufficiently demonstrative of its efficacy; and Dr. RUSH placed confidence chiefly in large bloodlettings and active purgation.

261. Dr. PERCIVAL was amongst the first who appears to have been aware of the fact, that, however nearly acute hydrocephalus may approach true inflammation, it is no more identical with it, than the adhesive form of inflammation is the same as the diffused, or as erysipelas. He directed the means which had been previously recommended, according to the circumstances of the case; and combined the use of blisters, mercurials, and opiates, with that of squills, musk, and other diuretic and nervine medicines. Consistently with these views, he was cautious in the employment of bloodletting. Dr. PATERSON prescribed calomel and opium, and a more antiphlogistic treatment than was risked by Dr. PERCIVAL; but Dr. GARNETT, although he believed in the inflammatory nature of the complaint, hardly ventured beyond local depletions; and confided more in digitalis conjoined with mercurials, than in other internal remedies.

262. It is impossible for the experienced reader to have perused the writings on the disease, as far as I have now proceeded, without being forcibly struck with the circumstance, that great misapprehension prevailed as to the succession and *ensemble* of morbid phenomena, on which the name acute hydrocephalus has been imposed. This is shown by many of the cases adduced by authors in support of the inflammartoy nature of the disease; these cases exhibiting the usual results of inflammation only: whilst those who observed the fluid collection unattended by very remarkable inflammatory appearances, limited their idea of this malady to such as these only, and considered them as distinct from those evincing changes strictly referrible to inflammation, without any, or with but little effusion; which latter cases they viewed as constituting true inflammation of the brain and its membranes, and not falling within their definition of hydrocephalus, however nearly the symptoms of the one resembled (in consequence of the physical condition of the brain) those of the other. The fact is, that the larger number of writers down to the present day applied the term acute hydrocephalus to a certain succession of phenomena, without regard to the different pathological states giving rise to it, and the shades of diversity by which each may be recognised; and were either unaware of, or unheeded, the circumstance, that an inflammatory state of the brain and its membranes in young subjects may terminate without effusion, or may give rise to effusion to an extent warranting the denomination of hydrocephalus; and that, moreover, water may

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* Since the above was sent to press, the fifth volume of M. ANDRAL'S "*Clinique Médicale*" has appeared. It contains a few cases of idiopathic and acute effusion of fluid into the ventricles, occurring in adults, both without and with slight inflammatory changes or softenings of the surfaces of these cavities, or parts adjoining. The symptoms, in these cases, were those of *waterstroke*, or of *serous apoplexy*. Two cases occurred in persons who were labouring under dropsy of other cavities.

be collected within the cranium, without any truly or sthenically inflammatory action of the vessels; and, nevertheless, the most experienced observers often will hardly be able to distinguish, by means of the symptoms, between these classes of cases.

263. The *intentions* with which the treatment of acute hydrocephalus should be conducted, are resolvable into the following: — 1st. To remove all causes of irritation or morbid action operating either directly or sympathetically on the brain. — 2d. To lower vascular excitement in the head, and equalise the circulation. — 3d. To guard against effusion, by fulfilling the above objects, by diverting the morbid determination of fluids from the head, and by changing the action of the extreme vessels. — 4th. To restore discharges and eruptions, when these have been suppressed. — 5th. To alleviate pain and sickness. — And, 6th. To support the powers of life, and to recruit them when they are sinking. It is obvious that the means which will accomplish one of these intentions, will often also fulfil one or more of the others.

264. The physician, having considered the origin, pathological states, the constitutional relations, the form, history, and stage of the disease, as well as the means which may have been already employed, should cause the patient to be placed in a well-aired chamber, and to be screened from strong light. The bed or couch should approach a slightly inclined plane, from which he ought to be slowly raised, and on which gently placed, when removal is necessary. All quick motions or changes of position, as well as excitement of the senses, and irritation of the temper, must be carefully avoided. The temperature should be rather cool than warm, and the bedclothes only sufficient to preserve the natural heat. With these preliminaries, the remedies determined upon should be promptly and faithfully administered. During both the first and second epochs of dentition, the patient's *gums* and *teeth* ought to be carefully examined, and the former freely incised, or the latter removed, as often as may be requisite.

265. *A. Vascular Depletion.* — In estimating the reported success of treatment in this disease, it is very necessary to keep in recollection that often no distinction has been made between it and encephalitis: indeed, many modern writers consider inflammation of the brain and its membranes, occurring in children, to be identical with acute hydrocephalus, — or, in other words, that this latter is the same as the phrenitis of adults. Now this sophism, so general and injurious in medicine — this affirming as true of the genus, what is true merely of the species — has had a most baneful influence on the treatment of this disease, inasmuch as it has led practitioners greatly to over-estimate the advantages of sanguineous depletions; a large proportion of their cases of imputed acute hydrocephalus being acute and sthenic meningitis or encephalitis, in which this evacuation may be carried much further than in the former malady; and has induced them to recommend, and others to employ, the practice with too little reservation. This circumstance is especially manifest upon perusal of the histories and treatment delineated by RUSH, MAXWELL, and several others, who have carried bloodletting as far as it is admissible in sthenic inflammation of the membranes. Having perused these authorities, after the experience derived from the treatment of very many hundred cases of cerebral diseases in children, I am convinced that the larger proportion of those which they considered hydrocephalus, was neither that malady, nor would have given rise to effusion in such quantity as to have justified the designation: the details they have furnished are decisive of the fact in the mind of the competent judge. Therefore, let not the inexperienced practitioner be led astray by the circumstance of its having been recorded by authors, that arteriotomy, large bloodlettings, &c., cured half the cases in their practice; I am convinced that the majority of such cases were simple encephalitis, or inflammation of the membranes of the base of the encephalon. Dr. MAXWELL avers that he cured sixty cases out of ninety — two thirds — by bleeding them in the horizontal posture until insensibility — occasionally for some hours — afterwards ensued. Would the most heroic practitioner of the present day attempt such practice in an undoubted case of acute hydrocephalus? I believe not.

266. (*a*) In the more *inflammatory states* of the disease, and especially in the *first stage* (§ 234.), the same means, as are fully described in the treatment of inflammations of the BRAIN and its membranes (§ 191. *et seq.*), should be employed; and to an extent which the pulse, the febrile excitement, and previous health and strength of the patient, will point out. These means consist of general or local bleeding, active purging, the application of cold to the head, derivatives and counter-irritants, mercury, sedatives, and diuretics, &c. In the inflammatory form, as it occurs either primarily or consecutively, these remedies may be prescribed very nearly in the manner explained in the article referred to. When the disease supervenes suddenly on any of the exanthemata, as decided depletory measures, as are advised for encephalitis thus occurring, must be pursued. (See BRAIN, § 191.) In children under three or four years of age, leeches, or cupping behind the ears, on the occiput, or on the nape of the neck, will be preferable to venæsection; but, after this age, the latter method may be practised in the first stage of the disease. I have observed no greater advantages obtained by bleeding from the jugular, than by bleeding from the arm. Many Continental physicians consider depletion more derivative when it is practised in the feet, and numerous facts favour the inference. In the *second stage*, local depletions, if they have not been already employed, or carried sufficiently far, and if circumstances indicating the propriety of the practice exist, may still be resorted to; but with strict reference to the pulsation of the carotids, the pain and temperature of the head, to the warmth of the extremities, and to the state of vital power. I have often derived advantage from repeated local bleedings even in this stage, aided by the other remedies enumerated, when employed in the manner about to be described.

267. (*b*) In the *first form*, as well as in such of the *third* as partake chiefly of the same character, *vascular depletion* must be employed with greater caution, and as early as possible in the *first stage*. I have seen hardly any benefit from it when the *second period* of this variety had com-

menced. When the disease has been detected sufficiently early, and when it has followed previous attacks of congestion or inflammatory action in the head, the febrile excitement being neither general, continued, nor well marked, the application of blisters behind the ears, and of leeches around, or close to, the blisters, has been of much service. But it will be requisite to repeat this practice every second or third day, or oftener, and to carry it as far as the circumstances of the case may warrant. If the cerebral affection appear to have been induced by disease of the digestive and chylopoietic viscera, a blister should be placed on the epigastrium or right hypochondrium, and leeches applied around it, as soon as redness is caused by it; when it ought to be removed. This method may be repeated, according to circumstances, after intervals of one, two, or three days: it possesses great advantages in this state of the disease, inasmuch as, whilst it relieves the gastric symptoms and the affection of the liver, it is a most energetic derivative from the head, without reducing vital power so far as general depletion does; for general bleeding, however early employed in this variety, is seldom productive of much benefit. Indeed, I have seen it detrimental in many instances; and I consider both it, and local depletion, if carried to any considerable extent, as decidedly injurious in some states of this form, particularly in weak and cachectic children.

268. *B. Cathartics.*—The discharge of morbid secretions and fæcal collections should be procured as early as possible by remedies calculated, at the same time, to derive from the brain, and to diminish vascular plethora and excitement. The fulfilment of this intention is appropriate to all the states of the disease. A large dose of calomel, either alone or with James's powder, ought to be immediately exhibited, and, after three hours, repeated with the addition of toasted jalap, or scammony; and its operation should be promoted by an active terebinthinate enema. If the irritability of stomach be such as to prevent the retention of medicine taken by the mouth, vascular depletion, a blister or mustard catalasm on the epigastrium, and an active cathartic enema, will often remove it. Calomel, in full doses, will generally be retained, under any circumstances; but, in conjunction with cathartics, it is frequently ejected, unless after the measures now stated. *Elaterium*, in small and repeated doses, has been suggested by Dr. Elliotson; but it, as well as *croton oil*, will seldom be kept on the stomach. When retained, they are occasionally of use. I have seen most advantage derived from the latter, when it has been added to the terebinthinate enema, or applied over the abdomen as a rubefacient. Dr. Cheyne found a drachm or two of magnesia saturated with lemon juice, given every two or three hours, most useful in such circumstances; and I believe that this will act more certainly than irritating purgatives, particularly if a full dose of calomel have been taken a few hours previously. A gruel or broth enema containing some purgative salt may also be administered two or three times in the course of the day; and if the bowels be very torpid, and the sopor considerable, the terebinthinate enema should be repeated daily, or even oftener. Saline purgatives may also be given in the infusion of senna, when they can be retained. Active catharsis at the commencement of the disease, after vascular depletion has been instituted to an extent which the nature of the case demands, will have a more decided effect than any other means whatever.

269. *C. Cold applications* to the head, the hair having been removed from it, should be employed in the manner, and with the precautions, directed in the article Brain, § 192., whenever the temperature of the head will admit of them. But, like the measures already advised, it is only early in the disease, and in the inflammatory states more especially, that they are productive of much benefit. In these states they may be used simultaneously with the tepid semicupium or pediluvia, salt and mustard having been added to the water. Rush, Quin, Conradi, Formey, Goelis, and nearly all the writers on the disease, are favourable to cold applications in its treatment; and, in some form or other, they are appropriate to most of its states.

270. *D. Mercurials.*—These are, perhaps, the next important means that can be employed. They have been very generally prescribed since they were first adopted by Dobson and Haygarth, and subsequently by Eason, Mackie, Reeve, Lettsom, Hooper, Hopfengärtner, Ferriar, and more recent writers. Early in the *first stage* of the disease, *calomel*, given every three or four hours, in full doses, either alone or with James's powder, in small quantities, is, in ordinary circumstances, the best preparation. In children under one or two years, neither salivation, nor much intestinal disorder, will be produced by it. In those above three or four years, its specific action may be obtained, but with little certainty, even although it be conjoined with opium or the compound ipecacuanha powder. When no essential benefit has accrued from the foregoing means, and the bowels have been fully purged as directed above (§ 268.), then calomel may be given with digitalis and narcotics, or with the latter only, particularly opium or hyoscyamus, with the view of fulfilling the *third* and *fifth* intentions of cure (§ 263.). But in young children, especially when the bowels are griped or are irritable, the *hydrarg. cum creta*, with small doses of compound ipecacuanha powder (F. 653.), will be most serviceable. The bowels, however, should always be kept sufficiently free by either of the enemata recommended (§ 268.). I may add, that calomel has been prescribed with cantharides, by Dobson; with James's powder, by Campbell; with opium, by Leib and others; with digitalis, after local depletions, by Weaver, Goelis, and Fischer; with digitalis and arnica, by J. P. Frank; and with active purgatives (in which form I believe that it is most generally beneficial), by Hufeland, Cheyne, Abercrombie, and many others. Dr. Merriman and myself have given very small doses of the *oxymuriate* of mercury, every four or five hours, with advantage. In the *second stage*, this is one of the best preparations that can be prescribed; but it requires much caution; and, in this period of the *first* and *third forms* of the disease, it should be prescribed in tonic and diuretic infusions. The utmost care should be taken in exhibiting mercurials in these forms, particularly in cachectic subjects, and where the powers of life are much

reduced. The state of the gums, mouth, and tongue, should be always carefully observed during their use; for I have seen fatal sloughing of these parts follow from them in such cases. The external employment of mercurials has also been recommended by CAMPBELL and others. The *ointment* may be rubbed into the scalp, or between the shoulders, in the more urgent cases; but I have seldom seen advantage derived from this method. Mercurial ointment may also be employed in dressing blistered surfaces; or the *liniment* may be applied to them on warm bread and water poultices. This plan has sometimes been productive of benefit, particularly in children of two or three years of age or upwards.

271. *E. Derivatives and Counter-irritants* are often serviceable, especially in the *second stage.* They are also admissible in the *first stage* of the *first* and *third forms,* when there is little febrile heat, or when the lower extremities are cold or cool. *Blisters* have been very generally preferred by MONDSCHIEN, RUSH, ODIER, PERCIVAL, CHEYNE, HOPFENGÄRTNER, GOELIS, &c. Much difference of opinion, however, exists as to the places to which they should be applied. They may be placed between the shoulders, on the thighs or legs, on the epigastrium, and on the neck and occiput, and behind the ears, in the earlier stages of the disease; and in infants they should be removed as soon as they produce redness. In the *first stage,* they ought to be preceded or accompanied by depletions (§ 266, 267.); and in older children they may be kept discharging for several days, or be repeated. Some writers, and especially PORTENSCHLAG, WHITE, HOPFENGÄRTNER, SIMMONDS, GARDIEN, and ELLIOTSON, have advised them to be placed upon the head or occiput; but I have never seen benefit derived from them in the former of these situations, unless in cases where the disease has followed the suppression of tinea capitis, or in the *second* or *third stages,* when the sopor has been great; and then the blister may be large, and the part over the occiput kept discharging for some time subsequently. In infants, *sinapisms* to the epigastrium, or lower extremities, are often preferable to blisters in these situations. The tepid or *warm semicupium* and *pediluvia,* salt and mustard having been put into the water, are often of use in the second stage, or in the first, when the extremities are cool; but when there are general febrile excitement, and much heat in the head, they are seldom of service, unless in a tepid state, and in conjunction with cold applications to the head after evacuations have been directed. The *warm bath* is less serviceable than the semicupium, and is as often detrimental as beneficial in the early periods of the more inflammatory states of the disease. The *vapour bath* has been proposed by Dr. A. HUNTER. M. ITARD advises it to be impregnated with vinegar. This practice is admissible chiefly in the second stage. *Setons* and *issues* are too slow in their effects for this disease; and the same may be said of the tartarised antimonial ointment. But I have seen benefit result from producing erubescence by *croton oil.* In the latter stages, *urtication* may be practised. *Moxas* have been applied to the occiput and behind the ears, by M. REGNAULT. Dr. MERRIMAN has had recourse, in several instances, to the *tinctura lyttæ* in doses of from five to ten minims, given every four hours, until severe strangury was caused by it; and in three of these cases the disease was arrested. It may act beneficially, not merely as a derivative, but as an excitant of nervous power.

272. *F. Sedatives and Narcotics.* — (*a*) *Digitalis* has been much employed in this disease since it was first recommended by WITHERING. BROWN, WHITE, CHEYNE, and others, have mentioned it favourably. Any of its preparations may be used. GARDIEN prefers the ætherial tincture, which he directs both internally, and externally in liniments. GOELIS and MERRIMAN prescribe half a grain of the powder with a grain of calomel every four or six hours; and WENDELSTATT, any of its formulæ with opium. KLEBER advises that it should be rubbed in over the scalp, with the *vinum scillæ.* It may be given in both the *first* and *second* stages; — in the former as a sedative of vascular excitement; in the latter, to modify the state of the capillary circulation, and prevent effusion. Much discrimination, however, is necessary in distinguishing the effects of this medicine from the symptoms of the second stage — particularly the vomiting, slowness of the pulse, and dimness of sight. Dr. CHEYNE points out certain differences between them; but they cannot be relied on. The sopor and strabismus, however, of this stage will generally distinguish it from the depression produced by digitalis. When this substance is prescribed in the first stage, it should be given at once in a full dose, and be repeated every four or five hours. In the second stage it may be conjoined with squills, the spiritus ætheris nitrici, or with serpentaria, or the decoction of the flowers of arnica, as advised by several German physicians. *Colchicum* has also been employed in this disease, within the last few years, with the same intentions as digitalis. I am unable to speak of its effects, as I have considered it less appropriate than this and some other remedies. It may, however, be prescribed in the same stages as digitalis. Little benefit can be hoped from it, especially in the second period, unless it act upon the kidneys or bowels.

273. (*b*) *Opium.* — PERCIVAL, ODIER, CRAMPTON, BROOKE, and many of the writers already referred to, recommend this substance in the *second* and *third* stages, particularly when the pain in the head, the convulsions, and irritability of the stomach and bowels, are very prominent symptoms. In the earlier part of the second stage it may be given with *calomel,* James's powder, or antimony. When the bowels are very irritable, without sickness at stomach, it is preferable in the form of DOVER'S powder, with hydrarg. cum creta; and, when the general irritability is great, or the convulsions violent or frequent, with full doses of *digitalis.* Later in the disease, I have seen benefit from it in small doses given in the terebinthinate enema directed above, or with serpentaria, or diuretics. *Hyoscyamus* may be employed with the same intentions, and in similar states of combination, as opium; but I doubt its being equally efficacious.

274. *G. Antimonials.* — The tartarised antimony, in large doses, — in from five to twenty grains in the twenty-four hours, — has been advised by the followers of the new Italian doctrine, and employed successfully by M. LAENNEC in a

few instances. Although long in the habit of having recourse to this practice in pulmonary and some other diseases, I have had no experience of it in acute hydrocephalus. Small doses of James's powder with calomel, or with calomel and active cathartics, or with calomel and opium, as prescribed by Dr. CHEYNE, appear the most judicious mode of directing this mineral. I have seen, however, benefit follow moderate doses of the tartarised antimony, either with or without opium, as recommended by Dr. MILLS, in the first stage of the disease, when vascular action and febrile excitement were great.

275. *H. Diuretics, &c.* can be but little confided in; yet I have believed them to have been of much service in the second and third stages of some cases. The most energetic is certainly the spiritus terebinthinæ, in the form of enema, or of liniment rubbed on the scalp. Squills, digitalis, spiritus ætheris nitrici, spiritus juniperi, or hydro-chloric æther, — formerly CLUTTON'S febrifuge spirit, — may be used, in these periods, with small doses of opium, or with a weak infusion of serpentaria, or decoction of the flowers of arnica. FLAJANI and KLEBER prefer squills to other diuretics; and I believe that they are not altogether without efficacy.

276. *I. Palliatives and Restoratives.* — The *pain* in the head and *vomiting* are to be relieved by the local depletions, — behind the ears and from the epigastrium, — and blisters in these situations; by the cold affusion on the head; by calomel with opium, and by the terebinthinate enema; or a warm terebinthinate epithem or sinapism placed over the stomach, till redness is produced. *Convulsions*, in the earlier periods, will be abridged by the cold affusion, and most certainly by the enema just recommended. A tobacco enema ought not to be hazarded. The oxide of zinc, or musk with ammonia, or with small doses of opium, may also be employed to relieve this symptom in the latter stages. I believe that practitioners in this country* have been too often deterred from the use of restoratives in the advanced periods, particularly of the nervous form, of the disease. I have, in several instances, seen benefit follow the cautious exhibition of them along with diuretics, and enemata with assafœtida. The preparations of ammonia with tincture of squills; or camphor mixture with magnesia, the tincture of valerian, and syrup of roses; or the weak infusions of arnica or of serpentaria, with liquor ammoniæ acetatis, digitalis and syrup of squills; or a weak infusion of green tea, either alone or with digitalis, and spiritus ætheris nitrici; and either of these, with a drop or two of laudanum, in small doses at short intervals, are the medicines I have most frequently had recourse to in the latter stages; allowing the patient beef tea, warm jellies, &c. in addition. In several cases approaching the sub-acute form of the disease, I have prescribed a solution of the hydriodate of potash in distilled water, with or without a little iodine added to the solution, in small but frequent doses, and with evident advantage. In a few cases, the compound infusion of roses, or a weak infusion of cinchona, or of valerian, have been given with some aromatic water, and with squills or spirits of nitric æther.

277. TREATMENT OF THE HYPER-ACUTE HYDROCEPHALUS. — But little can be done in this form of disease, owing to the circumstances under which it usually occurs, and to its severity as well as rapidity. In cases consequent upon exhaustion, the sopor or coma being profound, a blister on the head, the terebinthinate enema, and the treatment advised for the advanced stages of the acute hydrocephalus, are most likely to be useful. When it appears with less evident signs of exhaustion, leeches to the occiput or behind the ears, or cupping between the shoulders; active derivatives; a cold terebinthinate epithem applied around the head, and a blister on the epigastrium, with such internal medicines as the circumstances of the case require, conformably with what has been above stated; seem to be the most active and appropriate measures. The bowels should be energetically acted on, by medicines given by the mouth and exhibited in enemata, whenever the malady has not been consequent upon diarrhœa. When it supervenes during, or soon after, the eruption of any of the exanthemata, particularly scarlet fever, it is more or less inflammatory, and requires very decided treatment. Bleeding from behind the ears, or nape of the neck, should be carried as far as an attentive observation of its effects will indicate, particularly in children that have been well fed; and the rest of the remedies now advised, and especially the active enemata already directed, should be promptly, or even simultaneously, employed.

278. IN THE SUB-ACUTE FORM of hydrocephalus, a similar treatment to that which has been recommended for the acute, should be adopted early in the disease; vascular depletions being then practised, according to the circumstances of the case: and, when it seems disposed to pass into a more chronic state, small doses of iodine, or of any of its preparations, should be given during the day. A few grains of hydrargyrum cum creta, with digitalis, may be also taken at bedtime, and blisters be applied behind the ears, and kept discharging for some time. The bowels ought to be freely opened by the means already advised, especially the terebinthinate enema; and, in the latter stages, the same measures as have been directed for these stages in the more acute states of the malady, should be prescribed. If the disease assume a *chronic* form, the treatment about to be recommended (§ 297.) will then be necessary; but I have seldom seen benefit derived from any mode of treatment in such cases, probably owing to the disorganisation that has taken place in the brain.

279. DIET, ETC.—During the early periods of the disease, cooling diluents only, given frequently and in small quantities at a time, are required; but in the latter stages, particularly when the emaciation and debility are consider-

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* The following is an abstract, made in my note book many years since, of the practice of the most able German physicians in this disease. In the *nervous or typhoid variety*, cold applications to the head, sinapisms to the arms and legs, and purgative clysters. If these fail, digitalis, with the decoction of flores arnicæ or infusion of serpentaria; blisters from the occiput to between the shoulders to be kept open, the inunction of mercury three or four times a day; and, if the vomiting persist, sinapisms on the epigastrium. Subsequently musk and ammonia, chiefly on account of the convulsions. In *the inflammatory form*, and in *that consequent on the exanthemata*, local bleedings, digitalis, calomel and jalap, and, in the latter stages of these forms, the treatment directed for the nervous or typhoid variety.

able, suitable nourishment is necessary. If the child be still at the breast, the milk of the mother, or of a healthy nurse, in moderation; or asses' milk, beef tea, jellies, and the various farinaceous articles of food suitably prepared, are generally the most appropriate. During *convalescence*, the same kind of nourishment must be adopted for some time, but in more liberal quantities; and animal food should, at first, be cautiously and sparingly employed. Gentle tonics may also be exhibited, as a weak infusion of cinchona, or the compound infusion of roses. German writers prefer a weak infusion of valerian; and my experience leads me to concur with them. Either it, or the infusion of cinchona, may be given with magnesia, which will render it less unpleasant, and gently aperient; and, if the urine be not sufficiently copious, a little tincture of squills, or ammoniated spirit of colchicum, may be added; or the compound infusion of roses may be taken with a neutral salt. In the latter stages of the disease, or during early convalescence, if the secretions and excretions be morbidly increased, suitable nourishment, as well as restorative medicines, should be administered more liberally than in other circumstances; but, in every instance, the influence of the diet and of the remedies, upon the pulse, the temperature of the head, and the general surface, ought to be carefully watched. *Change of air* to a warm and dry situation, or, in summer, to the sea side, will have a very beneficial effect, and should be adopted as early in convalescence as possible.

280. PROPHYLACTIC TREATMENT. — We are frequently consulted, in the cases of children who are drooping in health, or who evince incipient symptoms of cerebral disorder; and even respecting those who have no manifest ailment; but for whom, owing to the circumstance of one or several of the children of the family having had the disease, measures of prevention become absolutely requisite. The best of these are, — 1st, the increasing of the abdominal and cutaneous secretions and excretions — 2d, the establishing an artificial irritation and discharge; — 3d, strict attention to diet and regimen; — and, 4th, change of air. — (*a*) The evacuations should be carefully examined; and, when the bowels are sluggish, or the bile deficient, hydrarg. cum creta, or calomel, with rhubarb or jalap, should be given at bed-time, in gentle doses. James's powder should also be prescribed, whenever the skin becomes dry, either alone, or with small doses of calomel. — (*b*) Issues, moxas, or repeated blisters, may be employed, with the second object. Blistering behind the ear, the discharge being kept up for a considerable time, is very beneficial. Issues, either in the usual way, or by means of the inner bark of the mezereon, or scraped horseradish, will also be very efficacious. Dr. CHEYNE refers to the circumstance of ten children in one family having died of the disease; the eleventh, for whom this means was employed, having been preserved. The nape of the neck, the occiput, or the upper arm, are the most suitable situations for issues. — (*c*) Moderate diet, and that chiefly farinaceous, of a bland quality, and easy of digestion, is extremely requisite. All stimulating aliments or drinks; warm opiates, and too much animal food, are very injurious. Children should also be instructed not to retain any of the excretions, after the first intimations to evacuate them; and their limbs and trunk should be freed from all close cinctures. Premature, or too great, exertion of their intellectual powers, particularly in forward or quick children, should be guarded against; and sufficient exercise in the open air should be imposed on them. — (*d*) In recommending change of air, the nature of the locality should not be overlooked. A dry, warm air is the most appropriate to hydrocephalic cases.

ii. CHRONIC DROPSY IN THE HEAD. — *Chronic Hydrocephalus.*

281. DEFIN. — *Effusion of a limpid fluid in the ventricles, commencing previously to, or soon after birth; frequently with enlargement of the cranium; and generally either unaccompanied by acute symptoms, or supervening gradually, with signs of debility.*

282. Chronic hydrocephalus has been stated above (§ 177.) to occur most frequently before birth, and sometimes to occasion the death of the fœtus. Some females have given birth to a succession of hydrocephalic fœtuses, either dead or alive, at some time during the latter months of utero-gestation. In such cases, the effusion is usually connected with defective developement of the cerebral organs, and with some other malformation or congenital disease. When it comes on after birth, it either commences so insensibly as to escape notice, until far advanced, or it is attended by symptoms of increased excitability of the nervous system: it seldom is consequent upon the acute disease, or upon other maladies. BOEHME and WIGAND believe that an hereditary disposition to be affected by chronic hydrocephalus after birth exists in some children; and ROSENSTEIN, STRUVE, LODER, GOELIS, and BRESCHET consider, that, when not congenital, it usually begins a few days or weeks after birth, and very rarely after some months or years. It may, however, occur in old age. GOELIS mentions a few cases of this kind; but they seldom are of long duration. Instances are not uncommon of considerable collections of fluid having formed in the ventricles of the brain, consecutively either of chronic diseases of the thoracic or abdominal viscera, or of prolonged affections of the brain itself, in persons far advanced in life; but these usually take place a short time only before death.

283. *A.* The CAUSES of chronic hydrocephalus are chiefly those assigned above as productive of congenital dropsies (§ 185.); family and constitutional predisposition, and a scrofulous and rickety diathesis. GOELIS states the circumstance of a mother having had successively six dead-born hydrocephalic children, at the sixth month; and three which became hydrocephalic after birth; and J. P. FRANK mentions another, who had seven children similarly diseased. The frights, passions, and diseases of the mother during gestation, have apparently some effect in producing this disease of the fœtus; and weakness of constitution in either parent is evidently not without a similar influence. M. BRESCHET thinks that the old age of the father is an influential cause; and I believe that both it and drunkenness in the mother may be included in the enumeration. This writer states, that a drunken man of about sixty, married to a young and healthy woman,

had three hydrocephalic children. Independently of diseases of the appendages of the fœtus, something, perhaps, may be imputed to the dress of the mother, particularly if it be such as may embarrass the developement of the uterus; for it has been observed by several pathologists, particularly GOELIS and BRESCHET, that hydrocephalus has occurred more frequently, either previously to, or soon after, birth, in the children of unmarried, than in those of married, females. Injuries experienced by the mother during pregnancy, and by the infant during parturition; improper diet and regimen of the infant; exhausting affections of its digestive organs; difficult, delayed, and disordered dentition, particularly when attended by disease of the prima via, and emaciation; as well as the causes assigned for the acute disease; may all occasion this species of it. GOELIS states, that a physician in Vienna, an ardent admirer of the doctrines of BROWN, allowed his children wine and other stimulants from their birth; they all rapidly became emaciated, and died with chronic hydrocephalus.

284. *B.* VARIETIES.— Chronic hydrocephalus is most frequently *idiopathic* or primary; commencing during the latter months of fœtal life, and sometimes after birth; and is occasionally consecutive or *symptomatic* of severe and exhausting diseases of the abdominal or thoracic viscera. It may be accompanied — (*a*) by a diminution of the size of the head, a variety which is always congenital; the fontanelles being frequently closed, and the sutures united, at birth; — (*b*) by a normal size of the head; — and (*c*) by more or less increase of the volume of this part.— *α*. In the *first variety*, the head has a conical form, being depressed laterally and anteriorly. The eyes are in constant motion, insensible to the light, and the pupils dilated. Most of these infants die in convulsions, either soon, or a few weeks after birth, and but very few live a few months, or a year or two. Those who live so long are entirely deprived of sense, and of every intellectual manifestation. Their appetite is generally voracious, but nutrition is very imperfect. Their legs are crossed and drawn up, and the feet distorted. The excretions are all involuntary, and life with them is entirely vegetative.

285. *β*. The *second variety*, or that in which the head is not materially increased in size, is supposed, by GOELIS and BRESCHET, to be the most common; but I think that such is not the case. It may be congenital, or may appear any time subsequently to birth. The writers now referred to believe that it is most frequent during youth and puberty, but that old age is not exempt from it. When chronic hydrocephalus occurs after the closure of the fontanelles, this necessarily is the form it most frequently assumes. SELLE has termed it *cephalic dropsy*. The symptoms of this, are the same as those of the next variety.

286. *γ*. The *third variety*, or that with increased volume of the head, according to my own experience, is the most frequent. It is very often congenital, the size of the head even in the fœtus being enormous. More commonly, however, the volume of the cranium is not much augmented at birth, but becomes so very rapidly afterwards. When the patient lives so long, the increase of size is slower after the third or fourth year, and ceases at the age of manhood, at which period the cranial bones are firmly united. When the cranium is very much enlarged, the countenance presents a nearly triangular form, owing to the bones and the lower features of the face retaining their natural size, or being smaller than usual. As the disease proceeds, the sutures are more and more separated — sometimes so far as to admit of fluctuation being felt, as remarked by TULPIUS, DREYSSIG, MONRO, and others. The veins of the neck become enlarged, (LENTIN saw them varicose); the carotid arteries pulsate with much force; and the head generally hangs on one side, or on the breast. Owing to the unequal yielding of the cranial parietes, some one part of the head is occasionally more prominent than another. The eyes are generally watery, covered by the eyelids; the pupils dilated, directed upwards, — occasionally downwards, (FEILER, GOELIS, SCHMIDT), — and sometimes horizontally to either commissure of the eyelids. The senses, the intellectual faculties, and the locomotive organs and functions, betray more or less disorder. Sight is first impaired, and all the other senses subsequently fail; the countenance is pallid and without expression; the complexion of the surface is unhealthy; the body emaciated; the gait unsteady; and the power over the muscles ultimately lost.

287. *C.* SYMPTOMS.— (*a*) It is important to ascertain the *symptoms* indicating *the commencement* of the malady, in such cases as occur, or seem to occur, after birth. In many instances, however, these are so slight as to be overlooked both by the nurse and the physician; and the age of the patient generally precludes many of them from being discovered. According to GOELIS, the nervous system is unusually excitable, the temper irritable, and the sense of smell perverted. At this period the eye is brilliant (FRANK, MICHAËLIS, SCHOEFFER), but the sight soon becomes more and more imperfect. VOGEL and MONRO have noticed pains in the globe of the eyes, that subside as the effusion is increased. The nose is dry, subject to itching, and is frequently picked by the patient. Hearing is, at first, morbidly acute, sudden noises sometimes inducing convulsions; but it soon becomes obtuse, and often altogether lost. Discharges from the ears are rare. The senses of touch and taste remain the longest. Rotation of the head occasions vertigo, or stupefaction; and, if the fontanelles be not closed, pressure on them produces convulsions, which sometimes supervene spontaneously at night. Sleepiness, or stupor; dull pain, or heaviness of the head; grinding of the teeth during sleep, the patient sometimes uttering a piercing or peculiar cry upon being awakened; and defect of memory; are also observed. Thus early in the disease, the appetite is often irregular or voracious; there is sometimes vomiting; the bowels are commonly constipated; and the urine diminished. Articulation is generally slow, nasal, or difficult. During this period, if the patient be old enough, he commonly is able to go about; but he is very feeble, and loses flesh. He walks, however, with great difficulty; totters; places one leg in the way of the other, and turns the toes inwards. Anger, and joy, are expressed with great vehemence; and the mental manifestations are more or less weakened or deficient. Such is the *first period* of chronic hydrocephalus; but it most frequently comes before the physician when the second stage has supervened.

288. (*b*) SCHMALZ, FEILER, GOELIS, and others, consider the copious flow of saliva from the mouth — which is always open — as indicating the *second* stage of the disease. When the patient can speak, he is now at a loss for words, or forgets them as he is about to utter them, and his voice is sad and monotonous. He is no longer able to go about; and is often sick. The bowels continue sluggish, and the urine scanty. The erect and sitting postures are attended by retchings, or vertigo, or pain in the head and stupefaction. The pupils are dilated; sight is more or less completely lost; the eyes roll from side to side; and squinting is sometimes observed. The pulse is small, irregular, and occasionally intermittent. Respiration, which was, in the first stage, scarcely affected, is often somewhat difficult, in some cases suffocative, and attended by a nervous cough. The position is often with the head very low, or drawn backwards; or upon the abdomen, with the face sunk in the pillow (FEILER and BRESCHET); and automatic movements of the limbs are frequent. Deglutition becomes difficult; but the appetite is still unimpaired, or even increased. All the senses and mental powers are more or less injured, or nearly lost.

289. (*c*) The *third and last period* may be said to commence with the involuntary discharge of the excretions, and abolition of all the senses; the patient lying with the lower limbs paralysed, or drawn up to the abdomen. Towards the close of the malady, the extremities become cold, damp, and often œdematous; the whole body extremely emaciated; and, if the patient has all his teeth, they are frequently worn to the stumps by the constant grinding of them in the early stages. Ultimately, either the symptoms of acute hydrocephalus, sometimes with convulsions, or those of apoplexy or coma, come on, and terminate life. Occasionally the patient is carried off by a paroxysm of convulsive or suffocative cough. The duration of these periods, especially the second and third, is extremely uncertain; and not infrequently very prolonged.

290. (*d*) Such is the usual progress of the disease, especially when it has seemed to have commenced after birth. But in these, as well as in such as have been congenital, modifications or anomalies present themselves. The senses and intellects may be quite unimpaired; or certain senses or faculties, only, may be impaired or lost, although the head is remarkably enlarged. The moral emotions, in such cases, are sometimes affected; the patient being passionate and vindictive; and fits of anger often excite convulsions. The sexual organs are sometimes prematurely developed, and the venereal desires strong even in children of both sexes. Great differences also exist as to the closure of the sutures and fontanelles; which very frequently remain much longer open than natural, especially when their separation has been considerable. CAVALLINI mentions a case, in which the fluid continued to ooze from between the sutures for some time before death; and Dr. BARON and Mr. MILLER have recorded instances wherein it dribbled from the nostrils, the *dura mater* having been ruptured, some days or weeks before dissolution.

291. (*e*) The *size* of the cranium is sometimes enormous, both previously, and subsequently, to birth. It is frequently, in the fœtus, increased to fifteen, seventeen, or twenty inches in circumference. WRISBERG records an instance in which it reached thirty inches and a half. MECKEL has in his museum the skeleton of a hydrocephalic fœtus of seven months, the horizontal diameter of whose cranium is sixteen inches, and the vertical diameter — from the occipital hole to the vertex — fifteen, being a circumference of forty-eight inches. And cases in which the head had acquired the volume of seventeen, twenty-five, twenty-nine, thirty, and thirty-one inches, soon after birth, have been recorded by LECHEL, MALACARNE, WILLAN, BARON, BÜTTNER, and MILLER respectively. It is only, however, the cranial part of the head which is thus distended; the bones of the face generally retain the natural size, or are developed in an inferior degree, especially in those cases which are prolonged to, or which pass the period of, puberty. The only instance in which the contrary was observed, is recorded by HARTELL, — the bones of the face having in that case acquired such a size as to resemble those of a giant. The form of the head is often not materially different from that of the fœtus; but, as the collection becomes greatly increased, it commonly extends in the direction of those parts where ossification is the least advanced. In some cases, one side either is more elevated, or is protruded more anteriorly or posteriorly, than the other, or both, the cranium assuming an oblique form in all its aspects.

292. (*f*) The DURATION of the disease varies extremely. It has already been stated to terminate fatally in the fœtus at any time during the latter months of pregnancy, or immediately, or shortly, after birth. Whether it commence previously, or subsequently, to birth, its duration may be indefinitely prolonged from some weeks to a number of years. HARTELL, MALACARNE, MILLER, and GOELIS adduce instances of hydrocephalic patients having lived seventeen years; LODER mentions one aged twenty-two years; BRESCHET, another who was twenty-eight; MICHAËLIS saw a case aged thirty; BUTTNER, one at thirty-one; SCHNEIDER, one at forty-three; AURIVILL, another at forty-five; SCHOMBERG, an instance of its having been prolonged to forty-eight years; and GALL, another, where life was prolonged to fifty-four years. A patient died a few years ago, in GUY'S Hospital, at the age of thirty-two years: his head was thirty-three inches and a half in circumference; his appetite and digestion were undiminished; and his mental powers not much impaired. Walking induced vertigo; and costiveness, convulsions. Coma came on a few weeks before death, and passed into fatal apoplexy.

293. *D.* APPEARANCES ON DISSECTION.—The cranial bones are generally found very thin, flexible, sometimes transparent, occasionally wider than usual; and the osseous fibres imperfect and radiated. In very young subjects, the bones are separated from each other by a greater or less interval; which is filled up, in somewhat older cases, by distinct points of ossific deposit, which ultimately constitute the *ossa Wormiana.* In rarer instances, the bones are thicker than natural, as in those recorded by HARTELL, REIDLIN, ALBINUS, MOLLINEUX, SANDIFORT, and LODER. The ossa Wormiana are, at first, scarcely in contact with the margins of the normal bones; but when the case has been protracted, they fully occupy the

space, and ultimately become indented into, or nearly consolidated with, them. Entire obliteration of the sutures is very rare. The *fluid* is generally effused in the ventricles, — always when the disease commences after birth; and but seldom in the general cavity of the arachnoid, excepting in the congenital disease; when the cerebral hemispheres are sometimes either partially or entirely wanting, the base, the *pons Varolii*, &c. only existing. When much fluid is effused into the ventricles, the brain is distended, its convolutions are unfolded, and it is reduced to a sac, thin in proportion to the distension; its structure with difficulty, or not at all, admitting of being distinguished into cineritious and medullary substance. The corpus callosum is much raised, and thinned, and the septum lucidum torn; the lateral ventricles communicating freely with the third, and this with the fourth, the whole forming one cavity. The cineritious substance is of its usual consistence; but the medullary is generally firmer than natural. The brain, however, does not appear to be diminished by interstitial absorption, as its weight is not materially less than the healthy brain at the same age. The arachnoid is occasionally whitish, opaque, and in some places thickened. The choroid plexus often contains small cysts; and the corpora striata, as well as the thalami optici, are small and flattened. The parts near the base of the brain, in some cases, present only slight alterations, varying with the duration of the disease, and the extent of the effusion; and, in other instances, they are so much changed, as hardly to be distinguished the one from the other. The cerebellum is seldom materially altered. The *quantity of fluid* varies from ten or twelve ounces to as many pounds; and cases are recorded of as much as ten or twelve quarts having been found. FABRICIUS HILDANUS (cent. i. obs. 10.) found eighteen pounds; and BONET (*Sepulchret*. l. i. sect. xvi. obs. 11.; see also *Ephemer. Nat. Cur.* dec. iii. an. i. obs. 10.) twenty-four pounds. The *analyses* of BOSTOCK, MARCET, BARRUEL, BERZELIUS, and JOHN, agree in showing that this fluid is of the lowest specific gravity, and contains the smallest quantity of albumen, and of saline ingredients, of all the dropsical fluids (§ 11.). Although, in the congenital form of hydrocephalus, the formation of the brain may have been so early arrested, as to occasion the absence of a great part, or of the whole, of it, yet its envelopes — the cranial bones, the dura mater, the arachnoid, and even the pia mater — may exist nevertheless. In some cases, the *falx cerebri* is wanting (BRESCHET), and, according to some authors, the pia mater also; yet it seems to be generally present, but so thin, from the distension of the fluid, as to be detected with difficulty. The arachnoid is more dense, and less transparent, than natural.

294. In the case that occurred, some years ago, at GUY'S Hospital, upwards of ten pints of fluid were contained in the great sac of the arachnoid, with which the ventricles communicated freely, the corpus callosum being wanting. The brain was lodged at the bottom of the immense cranial cavity; was somewhat flattened; and its convolutions unobliterated and unfolded. In a case recorded by Dr. BARON, the dura mater was found ruptured; a tumour of the cranial integuments having taken place over the seat of rupture some time before death. In a case described by Dr. DUNCAN (*Trans. of Med.-Chirurg. Soc. of Edin.* vol. i. p. 205.), the dissection of which was made by Dr. GORDON, the circumference of the head was twenty-nine inches and a half, and the fluid was contained in the general sac of the arachnoid, with which the ventricles freely communicated; the corpus callosum and fornix being entirely wanting, as in the case noticed above; the brain thus having a bifid or cleft appearance. A nearly similar instance is recorded by Mr. LOFTIE, in the *Medical Observations and Inquiries* (vol. v. p. 121.). In the one published by Mr. MILLER (*Trans. of Med. and Chirurg. Soc. of Edin.* vol. ii. p. 245.), the dura mater was ruptured, and water seemed to have been lodged between it and the cranial bones, as well as in the general sac of the arachnoid. But it seems probable, from the appearances observed, that the fluid had been originally in the ventricles, from whence it had escaped by a lacerated opening, caused by their uncommon distension; nearly nine pints of fluid having been found.

295. Chronic hydrocephalus, especially the congenital, is often associated with other vices of conformation (MECKEL, OSIANDER, MURRAY, DESLANDES, OTTO, AUTENRIETH, BRESCHET, &c.); as with cleft palate, single or double hare-lip, spina bifida (§ 178.), imperforate anus, distorted or club foot, and absence of one or more of the abdominal viscera.

296. *E.* PROGNOSIS. — When the disease is congenital, as it most frequently is, even although it may not become manifest until some days or weeks after birth, or when it appears soon after birth, little or no hope of benefit from treatment can be entertained; for, in such cases, it is often dependent upon imperfect or arrested developement of the brain. When, however, it is either obviously, or very doubtfully, not congenital, I agree with RICHTER, DREYSSIG, BLANE, PORTENSCHLAG, GOELIS, CONQUEST, and some others, in considering that it often admits of cure, particularly if it be treated early, if it be uncomplicated, and if the powers of the constitution be not much impaired. J. P. FRANK states, that he has seen it disappear upon the occurrence of scrofulous disease in another part. GOELIS and most other writers have seen more or less advantage accrue from spontaneous eruptions and sores, particularly behind the ears, and from chronic discharges from the bowels and skin, if they do not much reduce the patient's strength. When the disease occurs in those of a manifestly scrofulous or syphilitic taint; or follows the acute; or is far advanced; strangulating cough, difficult or suffocative respiration, coma, frequent convulsions, delirium, or other symptoms of the last period being present; hardly any hopes of recovery should be entertained. The exanthemata or hooping cough occurring in its course, generally induce a fatal termination in a short time. Its complication with hydrorachis, or with other forms of dropsy, is also very unfavourable.

297. *F.* TREATMENT.—The *indications of cure* are, —1st, to subdue irritation in the encephalon, when the symptoms of the first stage indicate its existence; 2d, to counteract the disposition to aqueous effusion into the ventricles; 3d, to remove the fluid, and prevent its re-circulation; and, 4th, to palliate urgent symptoms. — *a.* The *first* of

these intentions applies chiefly to those cases which occur subsequently to birth, and when evidence of nervous excitement or vascular irritation can be detected. In such cases, one, two, or more leeches, according to the age and strength of the infant, should be applied behind the ears, and means used to derive the irritation to some part of the cutaneous surface, or to the intestinal canal. In the majority of instances, the same measures as will subdue irritation, will also tend to the fulfilment of the *second* indication; more especially mercurials, aperients, purgatives, and artificial eruptions and discharges. In the use of this last, much circumspection is requisite; for tartar emetic ointment, or blisters kept open, may produce sloughing sores in young and delicate children.

298. *b.* To fulfil the *second intention*, various measures have been recommended. — *a.* GOELIS places most reliance upon small doses of *calomel*, — from a quarter to half a grain twice a day; and on the mercurial ointment applied to the head, either alone or with an ointment of juniper berries. He advises a flannel cap to be, at the same time, worn constantly upon the shaved scalp, to promote the insensible perspiration. This covering, in a few days, becomes charged with the ointment or ointments employed, and thereby tends to bring the system more quickly and fully under the influence of mercury. But affecting the constitution with mercury will rarely remove the disease; and, in very weak children, will only reduce more rapidly the powers of life, to which we should chiefly trust, as the more immediate agent by which this indication is to be fulfilled. My experience leads me to confide more in the *hydrarg. cum creta* than in calomel, in most cases of this disease. The best part of the treatment resorted to by GOELIS is the daily use of *mildly stimulating baths*. I have seen considerable advantage derived from them, especially when those first employed contained an alkali. Various tonic, astringent, diuretic, or slightly stimulating substances or infusions may be directed in this manner; as well as the preparations of *iodine*, or the *nitro-muriatic acids*, in very weak solution. M. RECAMIER states, that benefit has been derived from baths holding *tartar emetic* in solution; this substance being gradually increased to three or four times the quantity first employed; and that it acts as a diuretic.

299. In those cases, especially, which have commenced after birth, all morbid secretions and fæcal accumulations having been removed from the *primæ via*, by purgatives and cathartic enemata, from one to two or three grains of hydrarg. cum creta should be given night and morning, and the scalp shaved. If the head be quite cool, and without signs of vascular excitement, it should be kept moderately warm, and washed daily with a weak, tepid solution of the nitro-muriatic acids; the *baths* now recommended being also employed. This treatment, with proper diet and regimen, should be tried for some days, especially in delicate children; but in those who are stronger, it is preferable to exhibit, once, twice, or thrice a day, from five to ten or twenty minims of oleum terebinthinæ, with from twenty to forty or fifty of oleum ricini, according to the age of the patient, and effects produced upon the bowels and urinary organs. For infants, these oils may be mixed in syrup; but, by older children, they will be most easily taken on the surface of fennel water, or of milk. When this medicine does not act fully on the bowels, it may irritate the kidneys or produce strangury. In this case, it should either be intermitted for a few days, or given in larger doses, at longer intervals—or sometimes only twice or thrice a week — so as to act as a gentle purgative. An *enema* containing from one to four or five drachms of each of these oils, according to the age of the child, may also be administered every third or fourth day, in a suitable vehicle, either in addition to the above medicine, or when it is not prescribed; and the *liniment* F. 311. may be rubbed once daily upon the loins, or over the shaved scalp, the head being covered by a thin flannel cap. The hydrarg. cum creta should also be taken night and morning; and, if these oils be not employed so as to act sufficiently upon the bowels, as they ought, a full dose of calomel, or an active cathartic, should be occasionally given at bed-time. The above treatment was, for thirteen years, very generally adopted by me in chronic hydrocephalus, at the Infirmary for Children; and, in many instances, with marked success.

300. *β.* In other cases, particularly in private practice, and where the measures now detailed are not regularly pursued, owing to their unpleasant nature, a course of *iodine* should be entered upon, and continued for some weeks; but the preparations of this substance ought to be exhibited in doses which will not gripe or otherwise irritate the digestive canal; the alterative mercurial being taken at bed-time, and an occasional cathartic, or a terebinthinate enema, administered in the morning, during the course. If evident advantage follow not the iodine within a fortnight or three weeks, a *liniment* (F. 302.) or ointment (F. 767 —769.) of it, or an ointment of the *ioduret of mercury*, should be rubbed upon the head twice or thrice a day. If it occasion irritation in the scalp — which will seldom be the case with the preparations now referred to — the circumstance need not be considered unfavourable. If the internal course of iodine be not adopted, gentle aperients and diuretics, with mild tonics, should be taken in the course of the day. The above plans of treatment I have found more successful than any other; but they require great discrimination, and nice adaptation to the circumstances of the case: — that by the terebinthinated medicines has appeared most beneficial in the stronger children; and, whilst it has acted freely on the bowels, it has often greatly increased the quantity of urine: that by iodine is better borne by delicate children, but its operation is slower, than the former. The mouth sometimes becomes affected by the mercurial preparation during either of these courses, particularly in the older children; but this is to be viewed as a favourable occurrence. As long as the powers of the system continue but little impaired, and the patient does not lose flesh, either the one or the other course should receive a full trial; light and suitable nourishment being given, and the bowels kept freely open, always avoiding the supervention of diarrhœa.

301. *γ.* When these internal and external means fail of affording evident benefit in a few weeks, or when they cannot be satisfactorily tried, *blisters* should be applied, or *issues* inserted behind the ears, or over the occiput; and *tonics*, with laxatives and

diuretics, exhibited internally. Of these last, the *acetate of potash*, with *oxymel of squills;* and the *spiritus ætheris nitrici*, with a small addition of nitric acid; are amongst the best, and should, in the more debilitated, be given in tonic infusions. After the mercurial alterative has been continued sufficiently long, and the modes of treatment now detailed have been fairly but ineffectually tried, a very weak solution of the *nitro-muriatic acids;* or of the *hydro-chloric acid*, with the *chloric æther;* or of the *aromatic sulphuric acid*, with *Hoffmann's anodyne;* may be prescribed internally: but the exhibition of mercurials should be fully relinquished, and their effects satisfactorily ascertained, before any of these be taken, otherwise very serious disorder of the stomach and bowels may be occasioned by them. A succession of blisters to different parts of the head, the one side or part being allowed to heal whilst the other is discharging, is sometimes serviceable; but the blisters should not remain on after they have produced redness of the part, and the practice should be persisted in for some time.

302. δ. If acute symptoms supervene in the course of treatment, *leeching* or *cupping*, sometimes followed by *dry cupping*, and generally by calomel, and active purging, must then be resorted to appropriately to the strength of the patient, with such of the measures recommended for the acute disease, as the peculiarities of the case may require.

303. ε. If debility, languor of the circulation, and flabbiness of the soft solids, be considerable, in addition to the hydrargyrum cum creta, as advised above, the powder or infusion of *calumba*, or of *cascarilla*, or of *valerian*, or of *cinchona;* or small doses of the *sulphate of quinine*, or of the *sulphate of iron*, with the neutral sulphates — as the sulphates of magnesia, soda, or potass; or the sulphate or oxide of zinc; will be sometimes beneficial early in the second stage. The *ferrum tartarizatum* also should not be overlooked in the treatment of these cases. I have lately seen the *ioduret of iron* of service in two such instances. Several years ago, the *oxide of zinc*, or the *subnitrate of bismuth*, was frequently prescribed by me, in doses which would not offend the stomach, either alone or with mild vegetable tonics, and taken during the day; the mercurial alterative being continued night and morning, and a terebinthinate enema exhibited twice in the week. Some patients certainly improved, or recovered, under this treatment. But as most of these cases occurred in dispensary practice, the result in several of them was not ascertained. During the exhibition of tonics in chronic hydrocephalus, the secretions and excretions — both abdominal and cutaneous — ought to be freely promoted by means of slightly alkaline baths, and laxatives, otherwise the disease may assume an acute form, or pass rapidly into the *third* and irremediable stage.

304. ζ. Warm and other *diaphoretics* are directed by several writers: Hopfengärtner advising the flowers of *arnica*, and *serpentary root;* and Dr. Temple, the *doronicum Germanicum*, with the more common medicines of this class. *Digitalis*, and the internal use of *cantharides*, are recommended by many respectable authorities. These two may be conjoined; for the former will be given, with greater benefit, in this state of disease, with tonic infusions and stimuli, than in any other combination; but its effects must always be carefully watched. The internal use of the *muriate of baryta* and *muriate of lime* is suggested in the more manifestly scrofulous cases, by Autenrieth. The repeated exhibition of irritating enemata is enjoined by Mellin and Michaëlis, and has proved of great benefit in my practice, particularly the one already named (§ 299.). *Sialagogues* are favourably noticed, especially by the older authors. They deserve more attention than has been lately paid to them, and are certainly useful adjuvants, especially about the period of dentition, when the gums and teeth should be frequently examined; irritation of the former being removed by *incisions*. — *Errhines* are also prescribed, particularly by Heister, Forestus, and Mondschien.

305. η. *Various applications* — some of them the most opposite in their natures and effects — have been directed to be applied to the head, with the view either of promoting exhalation from its surface, and thereby transferring this action from the interior of the head; or of diminishing effusion in this situation, by restoring the healthy action of the capillary and exhaling vessels. Blancard and Fabricius recommend that the head should be kept warm by bladders filled with hot sand, or by sponges squeezed out of hot water; and Mondschien, that bags containing either unslacked lime, or roasted salt, be applied to it. Boerhaave, Borsieri, and Hecker advise *fomentations* with aromatic wines; Flajani, Plenk, Itard, and Kleber, *epithems* with the wine or vinegar of squills; and Psab, Deleurye, and others, *dry fomentations* with warm aromatic plants. Zwinger, Sorbait, and Mellin direct the scalp to be rubbed with *ointments* containing the etherial oils, especially the oil of turpentine or naphtha with alcohol; and Perdulcis, Johnstone, Monro, &c. favour the use of woollen caps which have imbibed the essential oils. Besides these, a variety of *plasters*, especially such as possess a deobstruent and tonic quality, are mentioned by writers. Of this class of means, the *plasters* F. 116, 117, 118. and the liniments F. 300. 311. are the most efficient. Acrid applications, and *scarifications* of the scalp, are likewise noticed by Heister and Diemerbroeck; and the actual or potential *cautery*, and *moxas*, by Chesneau, Tanaron, and several other Continental authors.

306. ϑ. *Gentle and continued compression* by bandages is recommended by Riverius, Formey, Pitschel, Blane, and Hood; and has manifestly been of service in some instances. Compression by means of strips of plaster, composed of equal parts of the emplastrum picis comp., and of the emp. ammoniaci cum hydrarg., or of these and the emplast. cumini, and spread on stiff linen, has been found by me preferable to the common method by bandages, and has commonly been employed in addition to the means detailed above (§ 298. *et seq.*). The plaster, thus composed, should be cut into slips; and, whilst each should partially surround the head, the number applied ought to be sufficient to cover the whole scalp, which must be kept closely shaven. In the case treated by compression, by Sir Gilbert Blane, leeches and purgatives were also employed; and a favourable termination resulted. Mr. J. F. Barnard resorted to pressure successfully in nearly the same manner as I have now advised, and used for the purpose broad strips of adhesive plaster. He also kept the head covered by linen wet with cold

water; a practice which should not be omitted whenever the temperature of the head rises above natural.

307. *c. The removal of the fluid by puncture* has been recommended from HIPPOCRATES to the present time. But it has never been practised with success until recently; and it is doubtful whether some of the cases which have been said to have recovered by the operation, have ultimately been cured. Indeed, great difference of opinion has existed as to the propriety of performing it. LE CAT, JUNKER, SORBAIT, REMMETT, and many recent writers, have advised and practised it; whilst HEISTER, BOERHAAVE, MORGAGNI, MONRO, BORSIERI, MERCATI, RICHTER, FLAJANI, PORTENSCHLAG, GOELIS, BRESCHET, HECKER, &c. are opposed to it, on the grounds that it has never cured the disease, but has often accelerated a fatal termination. After the medical treatment above detailed has been appropriately, sufficiently, and ineffectually tried, this operation, as it is not attended by any immediate risk, when cautiously performed, may be resorted to. In such circumstances, I have concurred in it, where it has been, in several instances, performed by my able colleague, Mr. DENDY, at the Infirmary for Children; but I recollect no case in which it has ultimately succeeded, although the management of the cases could not have been in more experienced hands. Many of the older writers, who advised the operation, conceived the water to be collected in the sac of the arachnoid, and not in the ventricles, and, consequently, that, in making the puncture, the cerebral substance would not be penetrated; but such is not often the case. Instances of its performance are adduced by TULPIUS, FABRICIUS HILDANUS, DE LA MOTTE, PETIT, WEPFER, E. FERDINAND, G. FABRICIUS, D. PANAROLIUS, and several recent writers. The following is a brief notice of those which are the most instructive.

308. *α.* LE CAT (*Philosoph. Trans.* vol. xlvii. p. 267.) operated on a child three months and a half old, affected subsequently to birth, thrice in three successive days; death occurred on the fifth day after the first puncture. The pineal gland was found nearly destroyed, and the ventricles much expanded. Dr. OPPENHEIM (RUST's *Mag. für die Gesammte Heilk.* b. xxiv. 1827.) operated on an infant of seven months with a trocar, leaving the canula in the puncture. It died on the seventh day. The membranes were somewhat thickened, and the brain soft and pulpy. Dr. WHITMORE (*Amer. Med. Recorder,* July, 1821.) punctured the head of an infant of six months, hydrocephalic after birth; and in eight days withdrew, without a canula, 116 ounces. Death followed on the tenth day, the membranes being found inflamed. Dr. HOOD (*Edinburgh Med. and Surg. Journ.* Oct. 1821.) operated on a child of nine months by a trocar. Death took place on the third day. The brain was softened and the *tubercula quadrigemina* were suppurated. Mr. DENDY (*Lond. Med. Repos.* vol. xix. p. 446.) operated on a congenital hydrencephalocelic case, aged ten weeks, with a large, deeply grooved needle, and removed eight ounces at three operations, with three days interval between each. Death occurred on the tenth day. The fluid was lodged in the left ventricle, over which the brain had not been formed. The membranes were found inflamed, and the brain surrounding the effused fluid softened. Mr. BROWN (*Med. and Phys. Journ.* vol. li. p. 102.) punctured the head of an infant of five months, on five occasions, in the course of thirty-six days. The last puncture was followed by great hæmorrhage and dissolution. Mr. GRAY (*Ibid.* vol. liv. p. 204.), from a child whom he had cured of *spina bifida* by compression, but who became hydrocephalic soon afterwards, drew off forty-five ounces of fluid at three tappings. The symptoms were mitigated for a time; but death followed on the thirty-first day. Dr. FRECKELTON employed five successive punctures with a trocar, in the course of fifty-six days. Death occurred on the fifty-ninth day. Mr. CALLAWAY (*Amer. Med. Recorder,* July, 1821.) operated on an infant five weeks old, and repeated the punctures on four successive weeks; but it died of marasmus and gradual exhaustion on the seventieth day. Mr. REMMETT (*Edinburgh Med. Comment.* vol. vi. p. 422.), in a congenital case, punctured the head with a lancet, two months after birth; and in the first six days, on three occasions, drew off thirty-six ounces in all. He repeated the operation twice subsequently, with a month's interval between each. The infant died of atrophy ninety-three days after the first puncture. On dissection, the fluid was surrounded by the membranes; the rudiments merely of a brain, in a softened state, being lodged at the bottom of the cavity. Mr. MONEY (*Med. and Phys. Journ.* vol. lii. p. 462.), operated on a congenital case ten months after birth, by a small trocar, on ten different occasions, during seventy-four days. The child died on the eighty-fourth day after the first operation. The membranes were inflamed, and the brain dilated into a large sac. Mr. SYM (*Edin. Med. and Surg. Journ.* vol. xxiv.), in an infant of eleven weeks, punctured the head, and repeated the operation five times in the course of ninety days, withdrawing about seven ounces of fluid each time. Death occurred on the 104th day. The arachnoid was thickened. The fluid was contained in its general cavity, and the brain imperfectly developed. Dr. GLOVER (*New York Med. Repos.* vol. iv.) operated in a congenital case, nine months after birth; and, in four months, withdrew 156 ounces at eight tappings; but death took place, after a considerable period of amendment, on the 120th day. Mr. LIZARS (*Edinburgh Med. and Surg. Journ.* April, 1821.) operated on an infant four months old; and in the course of 90 days repeated the puncture fifteen times, at intervals of from three to seven days, taking away each time from three to ten ounces of fluid. The child did well until convulsions occurred during teething; and the head was again enlarged. Puncture was again tried; but it died on the following day, and on the 171st after the first operation. Dr. VOSE (*Med.-Chirurg. Trans.* vol. ix.), in a congenital case, operated seven weeks after birth, and thrice subsequently, at considerable intervals. The sutures afterwards ossified; and, three months later, when he published the case, the child was doing well. Dr. MONRO, however, states (*Morbid Anatomy of the Brain, &c.* p. 146.), that symptoms of pressure appeared after the sutures were ossified, and the child ultimately died.

309. *β.* Mr. GREATWOOD (*Lancet,* No. 299. p 238.) records a case of a hydrocephalic child . fifteen months, who, falling on a nail, punc-

tured the head at the upper third of the lambdoidal suture. The wound continued to discharge fluid for several days, and it afterwards perfectly recovered from the disease. In the same work, for April and November, 1830, the operation of puncture is stated to have been successfully performed in St. Bartholomew's Hospital. GRAEFE (his *Journ.* for 1831, b. xv. p. 3.) punctured the head of an infant hydrocephalic from birth, in the fourth month, and repeated the operation about eleven times during six months. The fluid was allowed to escape slowly each time; the canula being removed, and the wound closed, as soon as the pulse became weak, After the last puncture, the sutures closed. The child could walk and speak when a year old. At the age of two years and a half, it was shown to the Medico-Chirurgical Society of Berlin. Mr. RUSSEL (*Edin. Med. and Surg. Journ.* July, 1832, p. 43.) operated on a girl eight months old, hydrocephalic from birth, and whose head was twenty-three inches in circumference when he first punctured it. The operation was repeated four times, after intervals of about ten days; but the quantity of fluid withdrawn each time was small. After the last puncture, calomel was given so as to affect the mouth; when the hydrocephalic symptoms disappeared, and ossification of the sutures proceeded. The case is stated to have been cured. Dr. CONQUEST is reported, in a contemporary work, to have operated in nine cases, — successfully in four of them. The greatest number of punctures in one case were five, and the intervals between them from two to six weeks. The largest total quantity of water removed was fifty-seven ounces, by five operations; and the largest quantity at one time, twenty ounces. The trocar was introduced through the coronal suture, below the anterior fontanelle, and the wound carefully closed after each evacuation. Pressure was made by means of strips of adhesive plaster.

310. The cases in which I have been concerned in directing the operation, have all been unfavourable to its success. Medical treatment had been actively and perseveringly employed in all of them; and it is therefore probable, that such of them as admitted of recovery were amongst the number that was cured. Whilst in those in which the operation was resorted to, and which were mostly congenital, either the state of the brain and its envelopes precluded recovery, or the circumstances in which out-door patients of public charities are placed were such as to render this operation less successful than it otherwise might have been.

311. *γ*. Having stated the evidence we at present possess of the success of the operation, inferences as to the propriety of performing it may be easily drawn. Those who argue against it contend — (*a*) that it is apt to induce an irritative state of inflammation in the substance or membranes of the brain, particularly in the weakened and otherwise predisposed systems of such subjects — 1st, by the mechanical injury done to those structures; and 2dly, by the entrance of air through the puncture; — (*b*) that the collapse consequent upon the removal of the fluid is injurious to the organ and system; — (*c*) that the operation cannot change the state of the organ or function giving rise to accumulation; and hence that it cannot be permanently successful; — and (*d*) that the instances of success from it are not so numerous as those from medical treatment.

312. Those in favour of the operation, on the other hand, argue — (*a*) that greater injury than that by the puncture is often done to the brain and membranes, without bad consequences; — (*b*) that the air may be prevented from entering by the aperture; — (*c*) that danger from collapse is readily obviated; — (*d*) that cures from medical treatment, in an advanced stage, and when the head has become greatly enlarged, are very rare, and are then most likely to be obtained by an operation; — (*e*) that the instances of success on record are sufficient to warrant its performance.

313. δ. From much experience, I conclude that inflammatory irritation of the brain and its membranes does follow the operation in some instances; that the state of these parts, and of the system, favours its occurrence; and that the encephalic structures are in a very different condition in this disease, both mechanically and vitally, — but especially as to proneness to inflammatory action, and softening, — from what they are in health. — (*a*) Whilst, therefore, I so far agree with those who argue for the operation, as to advise it to be tried after the measures I have detailed above have failed, yet I would not recommend its performance early in the disease — 1st, because medical treatment has then sometimes effected a cure, especially when the head has not been very greatly enlarged; and, 2dly, because, when the fluid is in the ventricles, as it generally is in cases commencing after birth, a greater depth of brain must be penetrated to reach it at an early, than at a later, period. — (*b*) When punctures are resorted to, medical treatment must not be abandoned, or even relaxed; for we should still endeavour, according to the principles explained above, to remove the disposition to effusion, as well as to promote absorption; and, as a certain degree of pressure is requisite to the healthy performance of the cerebral functions, strips of plaster, as are already directed (§ 306.), should be applied around and over the whole scalp, in order to prevent the collapse consequent upon the operation. — (*c*) I believe that the punctures ought not to be frequent, nor much fluid withdrawn at one time; that gentle pressure should be made around the cranium during the discharge; that the discharge ought to be stopped, and the puncture accurately closed, so as to prevent the entrance of air, as soon as the pulse begins to sink; and that restoratives should be exhibited, in order to prevent convulsions, or other nervous symptoms. — (*d*) The operation seems to be best performed by a small trocar, or grooved needle; but it is difficult to withdraw any fluid with the latter, as the surrounding pressure fills up the groove. The application of a cupping glass may, however, procure a discharge. A thin trocar, with a two-edged or lancet-shaped extremity, — not a thick triangular pointed instrument, — is preferable, upon the whole.

314. *d. Urgent symptoms,* especially convulsions, and inflammatory action, require to be palliated or removed. — *α. Convulsions* should be treated according to the manner described in that article, particularly by the terebinthinated medicines and enemata already prescribed (§ 299.); by these, conjoined with the syrup of white poppies, or this latter with the oxide of zinc; by

fœtid enemata; by cold or tepid affusions on the head; and by dry cupping on the nape of the neck, or between the shoulders. — *β*. The appearance of *acute symptoms* requires the treatment stated above (§ 302.); with mustard pediluvia, or mustard poultices to the legs and thighs; cold affusions and applications to the scalp, &c. — *γ*. In the *third stage*, the disease is generally beyond the influence of medicine; the disorganisation which has then frequently taken place in the encephalon not admitting of restoration; and it is chiefly in it that the palliation of urgent symptoms is required. But little beyond the fulfilment of this intention can then be attempted, unless *puncture* be resorted to as a last resource.

315. *e. Diet and Regimen* form no unimportant part of the treatment. The diet should be light and nutritious, and care should be taken not to allow the patient to eat so much at a time as to load the stomach. For infants, the milk of the nurse is sufficient; but she should be healthy, and fed upon digestible and nutritious food, and her bowels carefully regulated. Children who are weaned should have a small quantity of animal food; and be debarred from all acescent vegetables. Change, particularly from the close parts of a city, to a country air, which is warm and dry; and frequent exposure to the open air and to sunshine, in mild weather, are very serviceable. Many children have ravenous appetites, especially as the disease advances; these require sufficient nourishment, but more than that is injurious. In these cases, the terebinthinated medicines, more than any others, allay the insatiable craving, symptomatic of the malady, and tending to aggravate it when indulged; whilst they exert a very favourable influence on the disease. The drink allowed to the patient should be ordered with strict reference to the treatment pursued at the time, and should be as much as possible adjuvant of it.

316. *f. The prophylactic Treatment* may be comprised in a few words.—When any one of a family has had the disease, particularly if there exist a scrofulous or rickety diathesis, the state of the secretions and excretions ought to be carefully watched, and the earliest deviation of them from health combated by appropriate means. Cutaneous eruptions should not be interfered with, unless with great caution; all external medicaments to them should be avoided, and internal remedies, of an alterative, deobstruent, and diuretic kind only, be prescribed. The skin ought to be kept clean and perspirable. External injury of the head, and premature exertion of the mental faculties, must be avoided. Free and daily exposure to the open air and sunshine; moderate, light, and suitable diet; an open state of the bowels; a healthy nurse, whose mind is not liable to anxiety; and what has been already advanced above (§ 279, 280.); are all requisite to the prevention of the malady, particularly under the circumstances alluded to.

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DRUNKENNESS — Intoxication. — Syn. *Temulentia*, Pliny, Plater, &c. *Paraphrosyne temulenta*, Sauvages. *Ebrietas*, Lat. *Ivresse*, Fr. *Trunkenheit*, *Rausch*, Germ. *Ebbro*, Ital. *Ebriety*, *Inebriation*.

Classif. III. Class, I. Order (*Author*).

1. Defin.—*Mental excitement, followed by stupor or coma, from the excessive use of fermented or distilled liquors.*

2. The frequent occurrence of intoxication, either casually or as a confirmed habit, would justify the notice I am about to take of it, even independently of its influence in causing and modifying disease. But it is chiefly to the more complete states of intoxication, and especially those demanding medical care, that attention will be here directed. Drunkenness, in its various phases—from the daily indulgence in more vinous or spirituous fluids than is required, but short of affecting the nervous system in a very evident manner, up to that degree of excess by which the senses and intellects become obscured or entirely lost—predisposes to many diseases, and directly causes others. Slighter excesses in the use of fermented liquors—particularly wine and malt liquors—occasion plethora, with all the consequent ills, especially gout, apoplexy, paralysis, and congestion of the abdominal viscera. Greater excesses, and the too free use of spirits, exhaust nervous and vital power, inducing tremors, nervousness, delirium tremens, encephalitis, paralysis, and insanity; occasion affections of the digestive organs, particularly anorexia and dyspepsia, diarrhœa and dysentery, inflammation, and structural changes of the biliary organs; and produce disorders of the urinary and sexual functions, even sterility and impotency; and, ultimately, lesions of the kidneys, and dropsies.

3. Drunkenness is not a vice of recent date, although it may have become more common with the progress and diffusion of luxury. We find it mentioned in the early history of the Jews; and Tacitus informs us that it was prevalent amongst the ancient Germans. It is tolerably evident, from the ancient lyric and dramatic poets and satirists, that it was by no means infrequent amongst the higher classes in Greece and Rome. Hippocrates notices its worst states, both in his *Aphorisms* and in his *Prognostics*: and it does not appear to have been considered a very culpable sort of indulgence even by some of the sages of antiquity. Plato cautions against allowing wine to youths at an earlier age than eighteen years, and against becoming intoxicated before forty; but, after this age, he considered some degree of indulgence in this way pardonable. This was possibly, also, the opinion of Socrates.

> "Hoc quoque virtutem quondam certamine, magnum
> Socratem palmam promeruisse ferunt."
> Corn. Gall. Eleg. i. ver. 49.

And Horace states, that Cato the Censor often warmed his virtues by wine.

> "Narratur et prisci Catonis
> Sæpè mero caluisse virtus."

It is evident that the vice increased amongst the ancients with the diffusion of luxury; until, at last, even the ladies occasionally followed the example so generally set them. Valerius Maximus (l. ii. cap. i.) states, that, in the earlier periods of Roman history, the women seldom drank; and Seneca (*Epist.* 95.) remarks, that, at a later period, they indulged so freely in this way, that they became nearly as subject to the diseases occasioned by the practice as the men. Erroneous opinions as to the effects of intoxication upon the frame seem to have been very early entertained, and were generally prevalent in the fifteenth and sixteenth centuries. Montaigne mentions, that the celebrated Sylvius informed him that an occasional debauch was beneficial, inasmuch as it roused the energies of the stomach; an opinion long entertained by medical men, but zealously combated by MM. Hommets and Langlois. There can be no doubt, however, that, as expressed by the late Dr. Gregory, an occasional excess is, upon the whole, less injurious to the constitution, than the practice of daily taking a moderate quantity of any fermented liquor or spirit.

4. i. CAUSES. — This destructive habit, not many years ago but too prevalent even in the upper classes in the more northerly countries of Europe, fortunately now no longer exists, or not nearly to the same extent as before: but it is still as general as ever amongst the lowest orders, and those of weak constitutions, who have been indulged in youth, or uncontrolled, or accustomed at that age to taste cordials and spirituous liquors, or who possess little force of character or firmness of resolution. The unfortunate and unhappy, those of uncertain occupations, or whose homes are made miserable; also tavern-keepers, coachmen, commercial travellers, singers, working mechanics, persons whose parents have been drunkards, and those who are idle and unoccupied, and frequent clubs or meetings of lodges, &c.; often have recourse to it. The weak, good-natured, and social, not infrequently become addicted to it, from the manners and indulgences of those with whom they associate, until the want of the accustomed stimulus becomes distressing, and the resolution gives way before the desire of gratifying it, and thus the habit is confirmed.

5. ii. SYMPTOMS. — *A. The earlier phenomena* of ebriety are, mental exhilaration, joyousness, dissipation of care, with talkativeness, flushed countenance, increased animation of the features, especially of the eyes; a more copious transpiration from the cutaneous and pulmonary surfaces, and secretion of urine; augmented thirst; and full, frequent, and strong pulse. If the intoxicating fluid be more largely partaken of, vertigo, tinnitus aurium, double vision, and unconnected trains of ideas, generally uncontrolled by the will, supervene. During slight intoxication, the prevailing disposition and pursuits are made manifest; and hence the saying, "*In vino veritas.*" The irritable and ill-tempered become quarrelsome; the weak and silly are boisterous with laughter and mirth, and profuse in offers of service; and the sad and hypochondriacal readily burst into tears, and dwell on mournful topics. In a more advanced state, the excitement approaches nearly to that of delirium: the conceptions become disordered, the ideas confused, and various hallucinations sometimes are observed; the voice is thick; the eyes vacant; the face pale; the voluntary motions imperfect and unsteady; and the limbs tremulous, or incapable of their offices. Vomiting occasionally occurs in this state, and either diminishes or shortens the consecutive state of stupor. In a still more advanced stage, all the phenomena about to be described sometimes occur — occasionally with convulsions, and signs of dangerous coma, or even of asphyxy. The phenomena of drunkenness are happily and briefly expressed by LUCRETIUS: —

> ——— "Cum vini penetravit —
> Consequitur gravitas membrorum, præpediuntur
> Crura vacillanti, tardescit lingua, madet mens,
> Nant oculi; clamor, singultus, jurgia gliscunt."

6. *B. The phenomena of deep Intoxication* have been very closely and accurately studied by Dr. OGSTON; whose opportunities of witnessing them, particularly in their more dangerous associations, and as following the use of ardent spirits, have been unusually great. I shall, therefore, follow, in great measure, the description he has given of them. It should be recollected that the effects of spirits or other intoxicating liquors on the frame will vary with the habits of the individual; with his state of body, especially as respects vascular plethora; with the kind of inebriating agent indulged in; and the existing condition of stomach, chiefly as respects the presence of alimentary matters. But the most powerful modifying agent is temperature. Warmth increases the nervous and vascular excitement characterising the early stage; and diminishes the consequent exhaustion. Cold suppresses and shortens the early excitement, and hastens as well as augments the oppression and exhaustion of the advanced stage. — *a.* In the larger proportion of cases, however, after a longer or shorter period of unusual mental vigour, nervous excitement, and increased action, varying according to the surrounding temperature, the brain becomes oppressed; the powers of voluntary motion, which are early impaired, fail entirely; the mental manifestations are suspended; and, in the most severe cases, sensation is lost completely. In most instances, this state supervenes gradually; but sudden exposure to cold will often induce it rapidly. The person feels drowsy, and appears to fall into a sound sleep; but it is discovered, when the attempt is made, that he cannot be aroused to consciousness by any effort, or, if it partially succeed, he is hardly sensible of surrounding objects, and immediately lapses into his former state; the limbs remaining in whatever position they may be placed. At this period the face is pale, with or without nausea; or it is flushed; the eyes are vacant and suffused, sometimes glazed; the pupils dilated, and contracting very imperfectly, or not at all, by exposure to light. The temperature of the head is generally above natural; but that of the extremities, and often of the surface generally, is considerably lowered, or but little affected in the milder cases. The pulse, which was at first quick and excited, becomes feeble, small, and ultimately slow, and entirely wanting at the wrist, according to the degree of intoxication. Respiration is usually infrequent; the separate acts of inspiration and expiration, particularly the former, occupying a very short time; and is wholly or chiefly abdominal. The breathing is often laborious in the most advanced states; and, in these, the inspirations are convulsive, the chest expanding by the rapid contractions of the associated muscles of respiration. Strabismus, or tetanic convulsions, or spasms of particular parts, sometimes supervene in the more advanced states, and are unfavourable signs.

7. *b.* Such is the more common state or form of drunkenness: but alcohol occasionally causes modified effects; and, without much previous excitement, but always with more or less mental disturbance, produces prostration of the functions of the brain; the intellects, volition, and sensation failing almost simultaneously. In these cases, the face is pale, the eyes are more or less lively or injected, the pupils contracted; the pulse frequent, full, and soft; the respiration laborious or stertorous; the temperature uniform, and either at or above the natural standard, but seldom below it. The circulation, respiration, and generation of animal heat, may go on for a considerable time, in these, notwithstanding the paralysis of the brain; or continue until this organ has

recovered from its torpor, provided the body be not exposed to a cold atmosphere, or placed in unfavourable circumstances.

8. C. *Appearances after death.* — These very nearly resemble those produced by asphyxia. The countenance presents marks of anxiety or of convulsion; the eyes are prominent, the pupils dilated; the face livid or swollen; the lips blue; the cellular tissue injected with dark fluid blood; the air-passages reddened; the lungs dilated, and loaded with fluid dark blood, and more or less frothy mucus in the air-cells. The right cavities of the heart, the venæ cavæ, and the pulmonary artery, are filled with blood of a similar appearance. The left ventricle, aorta, and coronary veins, also contain a little dark blood; and the liver and kidneys are loaded with it. Blood possessing the same characters also fills the sinuses, veins, and even the smaller vessels of the encephalon. The cerebral structure is generally firmer than usual. More or less serum is found in the ventricles and between the membranes of the brain. Dr. OGSTON confirms the testimony of WEPFER, VOIGHT, CARLISLE, and others, as to the effused fluid being impregnated with alcohol. In describing the appearances in one of his cases, he states, that about four ounces of fluid were found in the ventricles, having all the physical qualities of alcohol; as proved by the united testimony of two other medical men, who saw the body opened, and examined the fluid. He thinks that the effusion takes place previously to the coma of intoxication; as he found it in considerable quantity, in two cases of drowning in the stage of violent excitement from spirits. MÜLLER states, that he found air in the sinuses of the encephalon. The mucous coat of the *stomach*, particularly in habitual drunkards, is thickened and softened; this latter change sometimes existing throughout the whole extent of the small intestines. In rarer cases, the coats of the stomach are remarkably thickened and hardened. Injection, and sometimes ulceration, of the *small intestines*, are also met with. The *liver* is frequently mottled, enlarged, and otherwise diseased. The *kidneys* are often enlarged, softened, paler than usual, granulated, &c.: the *urinary bladder* greatly enlarged and thickened.

9. iii. PATHOLOGY. — That a portion of the alcoholic constituent of the intoxicating fluid is absorbed and carried into the circulation, is proved by the odour of the expired air, and by the physical properties of the fluid effused within the head of persons who have died soon after having taken spirits to excess; and it is probable, if the urine were analysed, that a considerable quantity would be found to have passed off in this excretion. Deep intoxication seems to be occasioned as follows:—During the general nervous and vascular excitement consequent on the stimulus, increased determination to the head takes place, attended by excited vascular action; which soon terminates in congestion, as the excitement becomes exhausted, and gives rise to drowsiness, sopor, or coma. With this state of disorder, effusion of serum takes place in the ventricles and between the membranes, heightening the sopor and coma. When the congestion or effusion amounts so high as to impede the functions of the organs at the base of the encephalon, and of the respiratory nerves, respiration becomes infrequent and laborious; and, consequently, the changes produced by it on the blood insufficiently performed. In proportion as the blood is less perfectly changed in the lungs, the circulation through them is retarded, and the phenomena of asphyxy — congestion of the lungs, right side of the heart, brain, and liver; the circulation of the unarterialised blood; the imperfect evolution of animal heat, and sedative effects upon the brain and nervous system generally — follow in a more or less marked degree, according to the quantity of intoxicating fluid which has been taken; and either gradually disappear after some time, or increase until life is extinguished. These phenomena are heightened by cold, which depresses the vital actions in the extremities and surface to which it is applied, and increases the congestion of the above organs. The fatal consequence of intoxication is often averted by the occurrence of vomiting; the stomach thereby relieving itself from a great part of the poison; and the person recovering, after some hours of the above state of comatose intoxication. If the intoxicating fluid has been thrown or drawn off soon after its ingestion, the recovery of consciousness is more immediate. When intoxicating liquors are taken frequently, and to an amount short of intoxication, the digestive canal and liver are the first to suffer:—first in their functions, and subsequently in their circulation and organisation; this being one of the most fruitful sources of all the diseases, functional and organic, of these viscera, as well as of the nervous and vascular systems.

10. iv. The DIAGNOSIS of intoxication is not always easy. It is difficult to distinguish it, in its more profound states, from — (*a*) *apoplexy*, or *concussion of the brain*; (*b*) *asphyxy*; and (*c*) the extreme *effects of cold*. The odour of the breath is one of the best means of diagnosis; but is not to be depended upon alone: for a person may be apoplectic, asphyxied, or exposed to severe cold, after having taken only a small quantity of spirits; and apoplexy, asphyxy, and the effects of cold, often come in aid of the intoxicating agent, and heighten its effects: apoplexy, in those of a plethoric habit; asphyxy, from positions interrupting respiration, in addition to the operation of the poison as above explained; and cold, in the manner already mentioned. It will be very difficult to distinguish those cases of intoxication, where stertorous breathing is present, from apoplexy, unless by the smell of the breath, and of the matters thrown off the stomach. (See APOPLEXY, § 67.) It will readily be distinguished from *syncope*, by the laborious, infrequent breathing, by the smell of the breath, by the suffused eyes, and the livid or tumid features.

11. v. The PROGNOSIS is unfavourable, when the pulse is indistinct, or nearly gone from the wrist; when the respiration is laborious, stertorous, or puffing; when the countenance is pale, or livid and tumid; the pupils either much dilated or much contracted; the coma profound, and the extremities cold. Strabismus and tetanic spasms are also very dangerous symptoms; the former having been observed in three out of four fatal cases recorded by Dr. OGSTON. When these symptoms do not appear, the ill effects pass off, in a great measure, within twenty-four hours, although it is often much longer before all the functions regain their healthy tone.

12. vi. TREATMENT. — *A. Of deep Intoxication.* — *a.* The propriety of immediately *removing* the intoxicating liquor from the stomach cannot be disputed. This ought to be instantly done by the stomach-pump; for, in extreme cases, the stomach has become too torpid to be readily acted on by emetics. Mr. MACNISH advises the fauces to be tickled, and the sulphate of copper, or the sulph. of zinc, to be used as an emetic. Pressure on the epigastrium, when this organ is full, will insure the effect of emetics, when the pump is not at hand. When the stomach is not distended, the introduction of warm water will be often necessary before its contents can be withdrawn by this instrument; and, when it contains much solid food, the same measure will be requisite; the distension thus produced, often of itself causing the reaction of the organ, which may be assisted by pressure on the epigastrium. Sometimes the glairy state of the contents will render their removal by the tube somewhat difficult; but this may also be overcome by dilution, and the mechanical means now noticed. When the temperature of the head is high, or not below natural, and that of the surface generally not greatly reduced, the *affusion* of cold water on the head is both a safe and efficacious remedy.

13. *b.* I agree with Dr. DARWIN, Dr. TROTTER, Mr. MACNISH, and Dr. OGSTON, in reprobating indiscriminate *bleeding* in deep intoxication. Cases which seemed urgently to require it, were injured by it in the practice of this last physician. Dr. DARWIN remarks, that, when drunkenness "is attended with an apoplectic stupor, the pulse is generally low; and venæsection has sometimes destroyed those who would otherwise have recovered in a few hours." The *antidotes* most to be relied upon are the preparations of *ammonia* (MASURER, BROOMLEY, MACNISH, and OGSTON), particularly the carbonate and *liquor ammoniæ acetatis*, and cold or tepid affusion on the head. M. GERARD prescribes the *liquor ammoniæ*, in repeated doses of seven or eight drops. *Vinegar* has little effect; and it, as well as other acids, are considered injurious by ALBERTI. *Coffee* and *green tea* are much more efficacious; and have been very generally recommended. ALBERTI advises the application of camphorated spirit to the crown of the head.

14. *c.* When the *temperature* of the surface is at all reduced, means should be used to raise it. In many cases, the removal of the contents of the stomach, and the preservation of the natural temperature, with elevation of the head and a proper position of the body, all ligatures being removed from it, are the only measures required. In the more profound states of intoxication, however, external warmth to the extremities and epigastrium must not be dispensed with. It should always be kept in recollection, that a degree of cold which would not be injurious in other circumstances, may prove fatal to a person in this condition. As long as coma continues, the patient should not be left, lest he get into a position that may induce asphyxy. When violent delirium follows drunkenness, the shower bath, or cold affusion, and afterwards the exhibition and frequent repetition of tartar emetic, will often calm the patient.

15. *d.* The removal of the distressing *symptoms consequent upon intoxication* is sometimes a matter of medical duty. The principle contended for by the celebrated BROWN, and but too uniformly practised by him, of keeping up the excitement, was inculcated, and no doubt followed, by the monks of the *Schola Salernitana*; they, good souls, recommending —

> "Si nocturna tibi noceat potatio vini,
> Hoc tu mane bibes iterum, et fuerit medicina."

If there be no sickness, black and green tea, mixed, may be taken, as advised by ALBERTI; but where nausea exists, soda water, spruce beer, Seidlitz powders, the citrate of ammonia in a state of effervescence, and any neutral aperient salt in effervescing and aromatic draughts, will speedily remove disorder. Afterwards, moderate doses of sulphate of magnesia in compound infusion of roses, with a little additional sulphuric acid, will restore the digestive functions. If diarrhœa exist, the liquor ammoniæ acetatis, and spirit. ammoniæ aromat., with infusum calumbæ, and tinct. camphoræ comp., will soon remove disorder. When headach is distressing, and the skin hot and dry, the shower bath, cold sponging the head, saline aperients in an effervescing state, and tea, are, upon the whole, the safest means. Tonics, in conjunction with purgatives, may also be taken.

16. *B. Prophylactic means.* — *a.* The propensity to drunkenness, or even to that degree of excess which falls far short of intoxication, is seldom or ever removed when once established. In early life, and when the evil begins to manifest itself, the possibility of checking it may be indulged; but even then it is a difficult matter to succeed. Success will mainly depend upon the constitution and character of the individual, and the society he is allowed to keep. But instances have occurred, where there appeared to have been a growing addiction to it, of the evil having been arrested, by tartar emetic and other nauseous matters having been given to persons in a state of intoxication, or soon afterwards. I have, in several cases, advised some tartar emetic to be put into a glass in which soda water was about to be taken, in order to remove the disorder and sickness occasioned by extraordinary excess. The distressing sickness thus induced, and which may, in the helpless state of such persons, easily be prolonged, has occasioned such disgust at, and dread of, all intoxicating beverages, as to cause them to be shunned for a long time afterwards. But this plan, or even repetitions of it, will generally fail with those who have become habituated to this species of indulgence; particularly those who drink spirits, and who resort to it before dinner, and when unallured by conviviality: these are either altogether irreclaimable, or to be reclaimed only by careful management, and a very gradual diminution of the daily quantity of the intoxicating agent. The use of sulphuric acid in tonic infusions is sometimes of service in such cases as are checked at their commencement, the mind being actively and agreeably occupied. But medical means cannot be much relied upon, unless in conjunction with a judiciously managed moral restraint.

17. *b.* It may be gathered from PLUTARCH, PLINY, and others, that various substances were sometimes taken by the ancients, with a view of counteracting the intoxicating effects of wine. Some of these were both disgusting and ridiculous enough. Others, as olives and olive oil, absinthium, crocus, and resinous purgatives, were, perhaps, not altogether destitute of some influence. The Greeks

are said to have used common salt for this purpose; and the Romans surrounded their heads by wreaths, formed of various refreshing plants. Nothing further, however, may be said on this topic, than that intoxication, and perhaps various consecutive ill effects, will not so readily be produced when wine is taken upon a very large meal; but if this become a habit, it will very speedily induce gout or apoplexy. Cold applications, or cold sponging the head, will also delay or prevent intoxication, unless excess be carried to a worse than beastly length.

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DUODENUM — ITS DISEASES. — 1. That the duodenum performs an important part in various diseases, and that it is itself the chief seat of serious ailments, which are with great difficulty, or not at all, distinguishable from disorders of the stomach, pancreas, gall-ducts, liver, or right arch of the colon, cannot be doubted. Some writers, especially Dr. YEATS, BROUSSAIS, and his followers, suppose that affections of this viscus may be ascertained by attentive observation. They may in some cases; but with no degree of certainty; for, after the most diligent investigation of a train of phenomena apparently emanating from this organ, the inferences we shall arrive at will often possess only a certain degree of probability; for the same, or very similar symptoms, may proceed from the other viscera now named. It must, however, be admitted, that serious disorder of the duodenum will seldom exist without the functions of these organs being more or less disordered, as well as those of the stomach and small intestines; and ultimately organic change may be propagated to a greater or less extent from this viscus to one or more of them. It becomes, therefore, a matter of great importance to be acquainted with the symptoms occasioned by the more common pathological conditions of the duodenum, although we are at the same time convinced that these symptoms may be produced by changes in some one or more of the immediately adjoining organs. With all this uncertainty, however, the experienced observer will often come to just conclusions as to the seat and nature of the disease, founded on his knowledge of the functions and morbid relations of this and the surrounding parts. The duodenum is liable to all the functional and organic changes described in the article DIGESTIVE CANAL; but in different relative degrees of frequency.

I. FUNCTIONAL DISORDER OF THE DUODENUM.

CLASSIF. — I. CLASS, I. ORDER (*Author*).

2. i. PATHOLOGY. — (*a*) It is extremely probable that *impaired function* of this viscus gives rise to various symptoms of *indigestion;* warranting the designation of *duodenal dyspepsia*, if they could be distinguished from those proceeding from the stomach. But, granting that they can, we have no proof that the duodenum is the sole, or the chief seat of disorder, even in those cases which seem to admit of the least degree of doubt of such being the case. For, owing to the intimate structural connection — by continuity of tissues, blood-vessels and nerves — even functional disorder cannot exist to any sensible amount in it without being extended to the stomach, intestines, pancreas, and biliary organs. *Asthenia*, or deficient vital action of the duodenum, may be inferred in cases characterised by an unimpaired, irregular, or ravenous appetite; by constipation, and a deficient secretion and excretion of bile, the stools being light-coloured, greyish, or fœtid; by a loaded sedimentous urine; by a feeling of languor and drowsiness, with fulness at the right epigastrium, and oppression and sense of distension towards the right hypochondrium, or right shoulder-blade or loin, two or three hours after a full meal; occasionally by headach or vertigo; by absence of fever, and a pale, or foul lurid appearance of the cutaneous surface. But, in this state of disorder, the collatitious parts are coetaneously, and some of them even co-ordinately, affected. In attempting a fine series of pathological analysis, let us not be carried away either by flights of imagination or by efforts at mathematical precision, and attribute to a single organ what proceeds from several. But let us merely endeavour to interpret the phenomena of nature aright, according as they actually exist, and not as we suppose, or would have them to be. (See INDIGESTION.)

3. (*b*) Accumulations of *sordes*, the presence of *acid* and *acrid matters*, of *worms*, or of *morbid bile*, may very probably take place in the duodenum as a consequence of indigestion, or atony of the stomach, or of torpor of the liver, or even of the preceding affection; may irritate more or less its mucous surface; and, from its nervous and other structural connections, disorder the functions of digestion, chylification, assimilation, and fæcation; but the *ensemble* of symptoms that result can seldom be distinguished from those proceeding from disease of the stomach, pancreas, and biliary organs, owing to the reasons already assigned. These reasons will also explain the fact, that irritations seated primarily in this part may be propagated, along the digestive tube, to the stomach on the one hand, and to the intestines on the other; and along the ducts, to the liver and gall-bladder on the one side, and to the pancreas on the other: and I believe further, that frequent repetitions of such irritations, occasioned either by the nature of the ingesta, or by the state of the secretions poured into it, may take place without this viscus suffering materially in structure; and yet the disorder propagated from it to its collatitious organs may terminate in structural change of them. Such results are most likely to supervene in those who partake of a highly seasoned and stimulating diet; who indulge in vinous or spirituous liquors, or take too much or improper food. Irritation of the duo-

denum very probably constitutes a part of certain forms of dyspepsia; and even *pyrosis*, and other ailments frequently imputed to the stomach and the biliary apparatus may, with equal justice, be referred to this viscus; but it cannot be said to be the only part in fault, or even that primarily disordered; for it may be affected simultaneously with its related organs by changes primarily implicating its nerves and circulation.

4. ii. TREATMENT. — But little need be here added to what is advanced on this topic in the article INDIGESTION. It is obviously of importance to promote the functions of the duodenum by those means which are the best calculated to procure a due secretion of bile; as this fluid is essentially requisite both to the performance of those functions, and to the preservation of the tissues of the viscus in their healthy condition. But at the same time accumulations of fæcal or morbid matters in the bowels should be removed. A full dose of blue pill, or of hydrargyrum cum creta, should be given at bedtime with the common purgative extracts, and in the morning any of the aperient medicines in the Appendix, particularly F. 266. 382. 872. Dr. YEATS recommends either the infusion of chamomile flowers with the wine of aloes and liquor potassæ, or an infusion of quassia and senna with sulphate of potass, taken morning and mid-day. These, or F. 506. 547. 562., will be appropriate in most cases. But in those in which irritation is presumed to exist, I have preferred the following, which may be given daily, or on alternate days, until the evacuations become natural.

No. 196. ℞ Pilul. Hydrarg. gr. iij.; Pulv. Ipecacuanhæ gr. ss.—j.; Extr. Colocynth. Comp.; Extr. Hyoscyami, āā gr. ij.; Saponis Duri gr. j. M. Fiant Pilulæ duæ horâ somni sumendæ.

No. 197. ℞ Sodæ Sub-carbon. gr. xij.; Extr. Taraxaci ʒj.; Infus. Calumbæ et Infus. Sennæ Comp. āā ℥ss.; Spirit. Ammon. Arom. ʒss.; Tinct. Cardam. Comp. ʒj. M. Fiat Haustus primo mane capiendus.

5. When these fail of fully evacuating the bowels, the stools still continuing unnatural, or devoid of healthy bile, it will be advantageous to exhibit a full dose of calomel at bed-time, with the extracts of colocynth and hyoscyamus, and a grain of ipecacuanha; and a draught with the compound infusions of gentian and senna, with some neutral salt, in the morning. Having evacuated morbid matters, it will be requisite to give tone to the digestive organs, and to preserve a healthy secretion of bile, by prescribing two or three grains of hydrargyrum cum creta, or one or two of blue pill, at night, with extract of taraxacum, or with soap; and the infusion of columba or any other tonic, or the decoction of sarsaparilla with taraxacum, in the course of the day. When the mercurial is relinquished, small doses of the nitro-muriatic acids, with the spiritus ætheris nitrici, or the chloric æther, may be taken in the infusion of cinchona. A course of Carlsbad, or of any other alterative and aperient waters, either alone or assisted by the above alterative pill, particularly when the biliary secretion continues disordered, will often be adopted with advantage.

6. As much benefit will often accrue from a well-ordered *diet* and *regimen*, as from medicine in this complaint. The patient should be careful to partake only of light food, in moderate quantity, and at regular hours. He should masticate slowly and perfectly, avoid malt and spirituous liquors, and partake sparingly of wine. He ought to establish regular and habitual evacuations of the bowels, and take active exercise in the open air. Horse exercise, and the energetic employment of the muscles of the trunk and upper extremities, are preferable to walking. The shower-bath, or cold plunge bath, followed by frictions of the surface, will also prove of great service.

II. INFLAMMATIONS OF THE DUODENUM, AND THEIR RESULTS.

CLASSIF.—III. CLASS, I. ORDER (*Author*).

7. i. *Inflammatory Irritation of the Duodenum.* (*a*) The uneasiness or sense of fulness and weight which sometimes follows a meal in the course of two, three, or four hours, occasionally with a deep-seated, dull pain, or feeling of distention in the right hypochondrium, and extending to the right epigastrium, and backwards to the right shoulder-blade, may depend upon *chronic* or *sub-acute inflammatory irritation* or action in the duodenum; and, if nausea or vomiting, or pain on firm pressure directed towards the situation of the intestine, accompany these symptoms, the latter state very probably exists, either as a primary affection, or as a consequence of the disorders already noticed, and of affections propagated from the stomach or adjoining organs. The above inference will be further confirmed, if the tongue be loaded or furred at its root, its edges and point being red, and the papillæ erect; if the appetite be unimpaired, or even sometimes ravenous; if the palms of the hands and soles be hot, and the countenance and cutaneous surface more or less unhealthy; and the bowels relaxed, griped, and the stools crude or offensive. *Chronic Inflammation* of the duodenum, especially affecting its mucous surface, is generally *associated* with disorder of the stomach, biliary organs, and intestines; and often with chronic eruptions of the skin, particularly *herpes*, *psoriasis*, *pityriasis*, and *acne*. The bowels are in these cases usually irritated or irregular, the evacuations offensive and otherwise disordered, very rarely natural, occasionally containing much unhealthy bile, or evincing a deficiency or obstruction of this secretion. The skin is dry or harsh. There are also frequently slight fever, sometimes with chilliness, increased thirst, a gnawing sensation at stomach, or cravings for food, and variable capricious appetite. The spirits are often dejected, and occasionally disturbed by hypochondriacal or fanciful feelings. This state of disorder is not infrequent in females, and is in them often complicated with scanty, painful, and difficult menstruation, especially in unmarried females; and with headaches and various nervous complaints. (See INDIGESTION — *Irritative and Inflammatory States of.*)

8. (*b*) It has been supposed that *cholera* and *bilious diarrhœa* are chiefly owing to the acute inflammatory irritation of the internal surface of the duodenum by the morbid secretions poured into it; and doubtless such is the case in a great measure. But it should not be overlooked, that the organic nerves supplying the digestive tube are morbidly impressed at the same time by these secretions, and that the same agents quickly affect, by their presence, the whole canal, although the impression is more directly and powerfully made upon the mucous surface and nerves of this part. In *cholera*, and certain kinds of *poisoning*, therefore, where the internal coats of the stomach are violently irritated, the consequent phenomena are not to be imputed altogether, or even chiefly, to

this circumstance; but in a great measure, and sometimes chiefly, to the change produced in the nerves of the organ, and propagated throughout the system to which they belong, as well as to the parts which they directly or indirectly influence.

9. ii. *Acute Inflammation of the Duodenum.* — *Duodenitis* (*Duodenite*, Fr.) may be inferred with much probability, but with no certainty; for acute disease of the liver and of the gall ducts, or of the pancreas or of the pylorus, will give rise to very nearly the same phenomena. I believe that acute inflammation is not frequent in this viscus, or, if it be, that it does not so often give rise to disorganisation, as in other parts of the digestive canal. There can be no doubt that acute, sub-acute, and chronic inflammations are sometimes propagated to it from the stomach on the one side, and from the intestines on the other, as well as from other adjoining parts; and it would appear, from cases which I have examined, and from some recorded by M. ANDRAL (*Archives Gén. de Méd.* t. vi. p. 161.; and *Clinique Médicale*, t. iv. p. 344.), that inflammation may commence in the mucous surface of the duodenum, extend along the ducts, giving rise to obstructions of their canals, either with or without *jaundice*, and even advance to the organs to which they belong. We more frequently, however, meet with the consequences of inflammations of these parts, in *post mortem* examinations, than with the early inflammatory appearances themselves; whilst some of the associated lesions admit of doubts being entertained whether they be the results of inflammations, or of some other state of action; but that inflammation, in one or other of its forms, often attends these alterations, cannot be denied. Thus we occasionally observe thickening and injection of the mucous and submucous coats of this viscus, with obliteration of the common ducts, and these alterations with lesions of the biliary organs, a scirrhous or enlarged state of the pancreas, or adhesions of this last with the duodenum, or of the duodenum to other adjoining parts. Scirrhus of the pylorus not infrequently extends a considerable way along this intestine; and enlargements of its mucous glands, or ulcerations, to which it is less liable than almost any part of the digestive canal, are also observed in some instances in the parts more nearly adjoining it; but we very rarely meet with a case presenting evidence of acute inflammation, and its undoubted results, upon dissection, confined altogether to the duodenum.

10. SYMPTOMS. — *a.* Duodenitis, in any of its forms, is, therefore, very seldom limited, unless at its commencement, to this viscus; and, owing to the varied connections of this part of the canal, it may implicate more than one part of very different structures and functions. It may originate in any of the functional disorders already noticed; or may directly proceed from the kind and quantity of the ingesta, whether food, drink, medicines, or poisons; or from the irritating effects of the secretions poured into it from the liver or pancreas. Admitting, with BROUSSAIS, ANDRAL, BOISSEAU, ABERCROMBIE, ROSTAN, and others, the difficulty of recognising the disease during life, the existence of a dull, deep-seated, and dragging pain, in a direction from the epigastrium to the right hypochondrium, right shoulder-blade, and loin, increased upon pressure made on these regions, or upon torsion of the spine; sometimes but little felt, excepting in these circumstances, and two or three hours after a meal, when it occasionally becomes severe, and is attended or followed by sickness or vomiting; a sense of heat, or of gnawing, or of a foreign body in the region of the duodenum; great thirst; unimpaired or even a ravenous appetite; and an irregular or relaxed state of the bowels, the evacuations being copious, crude, unnatural, and offensive, are strong evidences of inflammatory action in the duodenum, especially when attended by febrile commotion of the system, similar to that already described (§ 7.), and by emaciation: but, in such cases, the immediately collatitious organs may also be diseased. Even in the more severe states of inflammation of this viscus, the pain and sickness may be very urgent a few hours after a meal, and yet but little complained of at other times, as in the rare case related by Dr. IRVINE, where the duodenum only was inflamed and extensively ulcerated.

11. *b.* More frequently, acute duodenitis is *consequent* upon gastritis; or *complicated* either with it, or with a similar change in the jejunum and ilium, or with both. When it has arisen from the extension of inflammation from the inferior surface of the liver, or biliary apparatus, or when this latter proceeds from it, the stomach generally participates in the disorder, at least of function. When an irritative or inflammatory state of action extends from the inflamed duodenum to the liver, the pain rises often high in the right hypochondrium, sometimes to the right side of the thorax, especially after a meal; and is attended by bilious vomiting, occasionally with bilious stools or diarrhœa, followed by constipation, nidorous eructations, prolonged digestion, a bitter taste in the mouth, a yellow coated tongue, and a slight yellowness of the conjunctiva, and unhealthy or yellow appearance of the skin. (See JAUNDICE.)

12. *c.* The *consequences* of inflammatory action in the mucous surface of the duodenum are, its extension — 1st, to the stomach or small intestines, or to both; and, 2d, to the ducts, occasioning, first, obstruction or obliteration of them; and, ultimately, congestion, engorgement, enlargement, or various other lesions either of the liver or of the pancreas, or of both, with *jaundice*, and other contingent changes. When the inflammatory action attacks the whole thickness of the parietes of the intestine, whether originating in its mucous coat, or extended to its more exterior tunics from collatitious parts, the pancreas, pylorus, duodenum, ducts, and even the liver and colon, not infrequently become accreted or welded into one mass; in which the pancreas is often remarkably enlarged, hardened, or scirrhous, the ducts obliterated or obstructed, and the accreted serous surfaces and cellular tissue hypertrophied, or indurated, or granulated and tuberculated. A case of this description, of which I kept notes at the time, occurred in a dispensary patient, in 1820; since when, I have met with several others — two of them with Mr. PAINTER and Mr. BYAM. In three cases of this description, recorded by Dr. BRIGHT, and in one by Mr. LLOYD, fatty matters were voided in the stools; but this phenomenon either did not exist, or was overlooked in those which occurred in my practice. The instances adduced by Dr. BRIGHT presented ulceration of the duodenum, which this able

physician considered of a malignant kind; the pancreas presenting the same diseased appearances as in the cases observed by me.

13. *d. Thickening* is one of the most frequent lesions to which the coats of the duodenum are liable; and occurs often in connection with a similar or more remarkable change in the pylorus. *Softening* of the interior tunics is equally if not more common. *Gangrene* is very rare; as also are *thinning* or atrophy of the coats, *ulceration,* and *erosion* or destruction of the villous membrane. Although enlargement of the mucous glands is more common in the duodenum than in the stomach, yet ulceration is, according to M. BOISSEAU, ten times more frequent in the latter than in the former.

14. *e.* In the cases of *ulceration* of the duodenum on record, most of the symptoms accompanying chronic inflammation (§ 7.) were present, with diarrhœa; and, in Dr. BRIGHT's cases, a discharge of fatty matters from the bowels. In M. C. BROUSSAIS's case, fatal hæmorrhage took place into the intestinal canal, owing to the extension of the ulcer to the coats of a large artery. In a case detailed by Dr. HASTINGS, the patient had complained, for two months, of occasional vomiting and costiveness; with pain and tenderness, on pressure, in the epigastrium and right hypochondrium, below the margins of the right ribs, and extending to between the shoulders. The pulse was ninety-six, the countenance anxious, and the skin yellow; and the body much emaciated. The liver and stomach were healthy. In the duodenum, beyond the part into which the ducts entered, a cancerous ulcer was found, larger than a crown-piece, with ragged and everted edges. Its surface was irregular from fungous excrescences. The coats of the intestine, around the ulcer, were much thickened. The rest of the bowels were natural.

15. *f. Perforation* of the duodenum may occur from ulceration, and give rise either to fatal peritonitis, as in the cases adduced by Dr. ABERCROMBIE and M. ROBERTS, or to adhesions and communications with other viscera; but these occurrences are rare. A case has been described by Dr. STREETEN, in which a communication took place between this viscus and an external opening between the seventh and eighth ribs, through which articles of food and drink were frequently discharged. The duodenum was found much contracted beyond the perforation in it, which communicated by a canal, two inches and a half in length, through thickened cellular tissue to the external aperture. This lesion was complicated with extensive disease of the liver and thoracic viscera. The most common changes consequent upon inflammatory action in this viscus, are, jaundice, and adhesions to the adjoining parts (§ 12.); its coats becoming thickened, hardened, and otherwise changed; the morbid mass forming a tumour, which sometimes may be recognised towards the right of the epigastrium, near the end of the eighth rib, upon a careful examination.

16. iii. TREATMENT. — *A.* In the *slighter forms of duodenitis,* local depletions by cupping or leeches will frequently suffice; but when they are associated with manifest plethora and congestion of the portal circulation, a moderate bleeding from the arm will be preferable, in the first instance. A blister, or rubefacient plaster, applied over the epigastrium and hypochondrium, after depletions have been carried sufficiently far, will act beneficially on the seat of disease, and will favour the secretion and excretion of bile. A full dose of calomel may also be given, and be followed either by a moderate dose of castor oil, or by a purgative enema. The effect of calomel upon the upper part of the alimentary canal is satisfactorily shown, both by direct experiment and therapeutical observations, to be sedative of inflammatory action in that situation. As the bowels are generally freely open in this disease, the object will be rather to correct than to increase the secretions from them. With this view, small or moderate doses of hydrargyrum cum creta, with pulv. ipecacuanhæ comp., or pulv. Jacobi, may be given at night; and the nitrate of potash, with subcarbonate of soda in the infusion lini comp., or decoctum althææ comp., with either extractum humuli or extr. taraxaci, according to the state of the bowels, during the day. After the alterative pills have been continued a few nights, a teaspoonful each of fresh castor oil and olive oil may be taken on the surface of some aromatic water; and, if the stomach does not nauseate it, this dose may be repeated at bedtime, or in the morning, for some days. If the biliary secretion be not improved after a few days, a full dose of calomel should be given again, and the milder preparations continued in small doses for some time, and conjoined with ipecacuanha, extract of hop, or hyoscyamus, or taraxacum, according to the state of the bowels. Where the bowels are very irritable, and the secretions morbid, the mercurials may, at first, be given with the extract of lettuce, or opiates, or Dover's powder; laxatives being subsequently resorted to for the removal of morbid collections.

17. *B.* In the more *acute states of inflammation,* one or more of the allied organs are often implicated, and both general and local bleedings, blisters, and other counter-irritants, and a full dose of calomel, or of calomel and opium, are requisite; after which purgative and emollient enemata may be thrown up, and gentle and cooling laxatives be given internally with anodynes, demulcents, and diaphoretics. If fever, or a sense of heat, be felt, the nitrate of potash may be given, with the subcarbonate of soda and the sweet spirits of nitre, in camphor mixture, to which either the extract of taraxacum, or of hop, or of lettuce, may be added, according to the state of the bowels; the mild mercurial alterative being taken at bedtime. Afterwards the solution of acetate of ammonia and camphor mixture, with the wine of ipecacuanha, and tincture of henbane, in small doses, may be resorted to through the day. If diarrhœa prevail, or supervene, the hydrargyrum cum creta should be given twice or thrice in the twenty-four hours, with small doses of rhubarb, or of compound ipecacuanha powder, in the form of pill; with small doses of magnesia in the compound infusion of orange-peel, or in any aromatic water. If costiveness occur, a full dose of calomel, with rhubarb or jalap, may be taken at bedtime, and the oils, as directed above, or the compound jalap powder, the following morning; their operation being assisted by enemata, or by any gentle aperient conjoined with emollients and anodynes, as may be found requisite. If much disorder still continue, especially of the biliary and other se-

cretions, a large plaster, consisting of the ammoniacum plaster with mercury, and the compound pitch plaster, in equal proportions, or of the former only, should be placed over the epigastrium and right hypochondrium, and renewed after a week. In some cases, the opium plaster may be substituted for the latter; particularly if the bowels be irritated. When there is much irritation of the nervous system accompanying the disorder of the digestive canal, much benefit will accrue from the hydrocyanic acid exhibited in demulcent or diaphoretic vehicles, as the camphor or almond mixture, or in both; and from the following, especially after morbid secretions have been evacuated by the foregoing means: —

No. 198. ℞ Camphoræ rasæ et subactæ gr. vj.—viij.; tere cum Magnes. ustæ ʒj., et Sodæ Subcarbon. (vel Potassæ Subcarb.) ℈ ij.; dein adde, Infus. Valerianæ (vel Aq. Menth. Virid.) ℥ vij.; Spirit. Colchici Ammoniati ℥ ss.; Syrup. Papaveris ʒ iij. M. Fiat Mist. cujus coch. ij. larga bis terve quotidiè sumantur.

18. Having removed the inflammatory state, by these and other medicines appropriate to the peculiarities of the case, a similar treatment to that recommended in functional disorder of this viscus (§ 4.) may be adopted, and nearly the same *diet* and *regimen* pursued. At first, however, very light, and chiefly farinaceous, articles of diet should be taken, and the beverage should consist of small glasses of spruce beer, or Seltzer or soda water, and the bowels regulated by an aperient and tonic pill (F. 558. 561, 562.), or by lavements of warm water. As the general health improves, a more generous diet, and a small quantity of wine, may be taken; regular and active exercise in the open air being enjoyed. After the more protracted cases, or when the secretions and alvine evacuations still continue, or readily become disordered, a course of taraxacum, with minute doses of a mild mercurial, subsequently of the nitro-muriatic acids, with compound decoction of sarsaparilla; or a course of either the Harrowgate, or the Marienbad, or the Carlsbad mineral waters may be tried.

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DYSENTERY.

Syn. — Δυσεντερία, Gr. *Dysenteria* (from δύς, *difficultly*, and ἔντερον, *an intestine*). *Difficultas Intestinorum; Tormina*, Celsus. *Rheumatismus intestinorum cum Ulcere*, Cælius Aurelianus. *Fluxus Cruentus cum Tenesmo; Fluxus Dysentericus; Flumen Dysentericum; Tenesmus*, Auct. Var. *Dyssenterie, Flux de Sang*, Fr. *Die Ruhr*, Germ. *Dissenterie*, Ital. *Bloody Flux.*

Classif. — 1 *Class*, 5 *Order* (Cullen). 3 *Class*, 2 *Order* (Good). III. Class, I. and II. Orders (*Author*, in *Preface*).

1. Nosol. Defin. *Tormina, followed by straining and scanty mucous and bloody stools, containing little or no fæcal matters; and attended by febrile disturbance.*

2. Path. Defin. — *Inflammatory action of a sthenic or asthenic kind, seated in the mucous surface of the intestines, chiefly of the large intestines, accompanied with more or less constitutional disturbance, and retention or disorder of the natural secretions and excretions.*

3. *Litt. Hist.* — Dysentery, owing to its prevalence in ancient as well as in modern times, has attracted a large share of the attention of medical writers. Hippocrates (*Opera, edit.* Vander Linden, vol. i. p. 252., vol. ii. p. 101. 176. *et passim*) notices it in various places, both as a sporadic and as an epidemic disease; and in such a way as shows that he was acquainted with several of its pathological states and relations, and even with its complication with functional and organic disease of the liver. Celsus (*De Med.* l. iv. cap. 15.) mentions it by the name of tormina, as distinct from tenesmus, from lientery (*levitas intestinorum*), and from diarrhœa. Aretæus (*De Sig. et Caus. Morb. Diut.* l. ii. cap. 9. ed. Boerhaave, p. 59.) attributed the complaint, with Hippocrates, to ulceration of the intestines; and was the first to describe it in an accurate and connected manner. Galen (*De Caus. Sympt.* l. iii. cap. 7.), although, perhaps, not the first to distinguish the different forms of the disease, has furnished us with the earliest attempt of this kind that we possess. He particularises a *sanguineous*, an *hepatic*, an *atrabilious*, and an *ulcerated* variety. Subsequent writers, — Greek, Latin, or Arabian, — down to the commencement of the sixteenth century, when the writings of the celebrated Fernel first appeared, added but little to the materials scattered through the works of Galen. From Fernel to the present age, the disease has been nearly as well understood, as respects both its nature and treatment, as at the present time. The numerous epidemics, however, that have occurred, and been described by experienced writers, from the time of this physician, have furnished diversified facts, illustrative of its varied forms, and of its treatment.

4. I. Seat and Forms of the Disease. — *A.* The ancient writers, from Hippocrates to Avicenna, considered dysentery to be *seated* in the internal coats of the intestines — particularly the large intestines — and attributed it too generally to erosion and ulceration. Cælius Aurelianus, Aëtius, Alexander Trallianus, and others, who wrote between Galen and Avicenna, entertained the same view as to its nature and seat, and imputed the modifications it presented to the particular part of the bowels chiefly affected. They even attempted, and not without some degree of justice and even of accuracy, to point out, from the character of the discharges and the appearance of the blood in the stools, its seat in the small intestines, in the colon, or in the rectum. Aëtius (*Tetrabibl.* iii. s. i. cap. 43.) believed that the jejunum is sometimes the part chiefly diseased, and described the symptoms — many of them really concomitants of inflammation of the mucous surface of the small intestines — that characterised this variety. Similar views were

entertained, also, by Alexander Trallianus, Paulus Ægineta, and Actuarius. An attentive consideration of the various manifestations of the disease, especially in an epidemic form, will show that these opinions are not without foundation. How far they are consistent with the results of modern researches, will appear in the sequel.

5. *B.* The *forms* of dysentery are extremely diversified: — (*a*) As respects its *Origin*, it is — *α. primary; β. consecutive;* and *γ. symptomatic.* — (*b*) In regard of the *Circumstances* under which it occurs, it is — *α. sporadic; β. endemic; γ. epidemic;* and, *δ.* both *endemic* and *epidemic*, in the same locality, on certain occasions. — (*c*) As to its *Type*, it is — *α. remittent;* and, *β. continued;* most commonly the latter, especially in temperate climates. — (*d*) As regards its *Character*, it is — *α. inflammatory; β. bilious-inflammatory; γ. simply asthenic; δ. bilious-asthenic; ε. adynamic* or *typhoid; ζ. malignant* or *putrid; η. scorbutic;* and, *ϑ. complicated.* — (*e*) As to *Intensity* and *Duration*, it is — *α. hyperacute; β. acute; γ. subacute;* and, *δ. chronic.* These modifications, or *varieties of character and intensity*, are, however, merely arbitrary distinctions, founded on the more prominent symptoms of the malady, and adopted chiefly in order to guide us in the appropriation of remedial measures. Indeed, it should not be overlooked in this, more than in other diseases which possess very specific and distinct features in a majority of cases, that it will frequently assume forms intermediate between *cholera* on the one hand, and *diarrhœa* on the other; between *fever* with enteric characters, and *colic* or simple *tenesmus;* that it may be but very slightly different from some one of these complaints; and that, in one or other of its forms, it may be *consecutive of*, or *lapse into*, any one of the maladies now named. This connection between disorders of parts intimately associated in function and structure, is merely what may be expected *à priori*, conformably with the pathological principles developed in the article Disease. The diversified forms and close relation of dysentery to other maladies are readily explained on these principles; especially if considered in connection with the nature of the different causes in which it originates; with the condition of the vital actions, the circulating fluid, and the secretions and excretions, at the time when its causes make their first impression; with the changes which concurrent causes induce from the commencement, and with the circumstances modifying the state of the circulating and secreted fluids in the progress of morbid action.

6. In describing the *varieties* or *states* of the disease, it is of the utmost importance — considering its great prevalence and fatality in certain circumstances, on many occasions — not to multiply distinctions beyond such as are well ascertained and are practically important; nor to neglect to notice such as have been accurately described — as are contingent on certain combinations of causes of occasional, but not of common occurrence; and, although neglected or overlooked, from an injurious spirit of simplifying or generalising, as nevertheless exist, and may be manifested in a prominent manner whenever the causes in which they originate prevail. Taking my own experience merely as a guide since 1812, when I first treated the disease — as I subsequently observed it in the tracks of the great armies which traversed Europe at the close of the Continental war — and as I was brought in constant intercourse with it for a time, in the most sickly climate within the tropics, in both European and native constitutions — independently of the graphic delineations of it in many of the works referred to, I consider dysentery neither so simple in its nature, nor so unvarying in its seat and forms, as some recent and contemporary writers in this country have stated. That writer will but imperfectly perform his duty who, in giving a history of a most prevalent and dangerous malady, confines himself to the particular form it has assumed during a few seasons, within the single locality or the small circle of which he is the centre, and argues that it is always as he has observed it; thereby affirming as true of the genus, what may be hardly true of the species, and even of it only under certain circumstances.

7. The different forms of dysentery are so entirely dependent upon certain states of the organic or vital actions, and of the secreted and circulating fluids, that these constitute the true basis of all distinctions between them, and of all rational indications of cure. These states, which are so important, are so difficult to ascertain and estimate truly, even by the most profound and experienced observers, and are so continually varying, that attempts to describe them must be received as approximations only to some of those which will frequently present themselves in practice: for the one will so insensibly pass into the other, both in different persons, and even in the same person at different stages, when certain agents are in operation, that the forms of the disease are not to be viewed as constant, but as changing according to circumstances, so as frequently to assume characters intermediate between those which are described. Although the features of the disease are so numerous and so changeable — as may, indeed, be expected from the operation of numerous agents in ever-varying states of combination upon the economy — yet the necessity of delineating certain of them which are the most prominent and the most common, as guides for the inexperienced, must be apparent. In our inquiries into the nature of, and the means of removing, morbid actions, the conditions of life are the chief subjects of interest; for these conditions constitute not only the chief changes, but also the sources, whence those which are organic spring. They are, moreover, the most directly and energetically impressed by remedial agents, and are the chief media by which structural lesions are removed. I shall, therefore, describe the forms of this malady, conformably with these views. It was evidently with a conviction of the practical importance of early and exactly recognising the states of organic or vital action, that J. P. Frank and Horn divided the acute states into (*a*) *sthenic*, and (*b*) *asthenic;* the former comprising the *simple*, the *inflammatory*, and the *bilious* varieties; the latter the *malignant* or *putrid*, the *scorbutic*, and the *nervous* of Richter, Kreyssig, and some other authors. Without adverting to the divisions by Sagar and Sauvages, which are formed upon no consistent principle, but chiefly upon the causes that produce the disease, I will notice such as have been adopted by some of the most experienced writers. Whilst they agree in the more general division into *acute* and *chronic*, they differ mate-

rially in the arrangement of the acute states. Zimmermann particularises the *inflammatory, malignant, putrid,* and *chronic* states. Richter describes the *simple, inflammatory, bilious,* and *nervous* forms; and Kreyssig adds to these the *pituitous* or *mucous,* and the *putrid* or *malignant.* MM. Fournier and Vaidy adopt nearly the same division as Kreyssig, but they adduce, in addition, the association of the disease with *typhus* and *ague.* Schmidtmann distinguishes the *simple,* the *inflammatory,* the *bilious,* and *bilious-inflammatory,* the *nervous,* and the *putrid* varieties. M. Vignes, one of the most recent and experienced writers on dysentery, considers, first, its *benign* or *purely inflammatory states,* under the denomination of *mucous* and *bilious;* and, next, its *malignant forms,* comprising the *typhoid, adynamic, ataxic,* and *complicated.* In the description I am about to give of the disease, I shall follow a nearly similar arrangement to the most approved of those adopted by the ablest and most experienced of my predecessors. In the *first* place, those *acute* forms will be noticed which are the most simple, which are more or less *sthenic* or *inflammatory,* and in which the vital energies are either not materially affected, or not perverted to the extent of subduing the natural tendency of the economy to resolution and to a restoration of the healthy action. *Secondly,* the *asthenic,* or more unfavourable and complicated states, which have been variously denominated, according to the predominance of certain characters, arising out of particular circumstances and epidemic influences, will be considered. Thirdly, the *chronic* and *complicated* forms will be described.

II. Of Acute Dysentery.—i. Its Simple, Sthenic, or purely Inflammatory States.

Classif. —III. Class, I. Order.

8. Defin.—*Tormina, tenesmus, mucous or bloody stools, and a sense of heat or pain in the colon and rectum, with tenderness on pressure, and symptomatic fever; the nervous, circulating, and muscular functions not indicating vital depression until late in the disease.*

9. *A.* Causes.—(*a*) The *predisposing causes* of the sthenic states of the disease are chiefly high ranges of temperature following wet and cold seasons; whatever favours the production and accumulation of morbid secretions in the biliary apparatus and *prima via;* debility of the digestive organs, particularly of the intestinal canal; a plethoric state of the vascular system; unnatural flexures of the colon favouring fæcal accumulations in the bowels; neglect of the functions of digestion and fæcation; the habitual use of spirituous liquors, or other inebriating beverages in excess; rich food, and highly seasoned cookery. Dysentery is generally most common in autumn and in the beginning of winter; in persons of the rheumatic diathesis; and in those who have undergone great fatigue; or who have been recently affected by continued, remittent, or intermittent fevers; but, in such circumstances, it is as often of an asthenic as of a sthenic kind.

10. (*b*) The *exciting causes* of the sthenic forms of the disease are drunkenness; exposure to vicissitudes of climate or of temperature, and especially to cold and moisture, or to the night-dews; sleeping in the open air, and more particularly on the ground, without sufficient protection intervening, or without requisite covering, as in the case of armies in the field; wearing damp or wet clothes, or too thin clothing; acerb, acid, unripe, or over-ripe and stale fruit and vegetables; raw, cold, and indigestible fruit, &c., as cucumbers, melons, pine-apples, &c.; the stones and seeds of fruit; unwholesome food, especially unripe or blighted corn or rice; and acid or unwholesome drink, as sour or bad beer and wine. The exhalations from wet, cold, and clay soils and marshes, or from the banks of lakes, rivers, and canals; and the use of marsh, stagnant, or brackish water for drink, with many of the causes mentioned in connection with the other forms of the disease (§22. *b.*), will also produce this form in persons of a sanguineous and plethoric constitution. Mr. Annesley states, that dysentery became, at one time, remarkably prevalent amongst the British troops in India to which he was attached, and that, upon investigation, he traced it to their eating the pork of the country with their breakfasts. Upon a stop being put to this practice, the disease altogether disappeared.

11. *B.* Symptoms and Progress.—Sthenic dysentery presents various states and grades of severity, depending upon the nature of the cause, the state of the secretions, and the degree of inflammatory irritation or of spasmodic action of the bowels resulting therefrom. It is often preceded by constipation when occurring sporadically, and frequently by diarrhœa when arising from endemic or epidemic causes; but in many instances the dysenteric symptoms appear from the first, and are attended by chills or rigors. When it is caused by endemic causes, or is epidemic, the inflammatory symptoms may be very slight, and yet the constitutional disturbance and morbid action of the bowels very considerable; or the irritation and inflammation may be along the small as well as the large intestines.

12. (*a*) The *milder state* of the complaint, especially as it occurs sporadically in Europe, commences either with liquid and feculent, or with mucous stools, the latter being occasionally streaked with blood, and always becoming so in a few days. Generally, horripilations or chills precede, accompany, or follow these evacuations, which are consequent upon gripings and a sense of increased action in the course of the colon; and are often passed with heat or scalding in the rectum, followed by straining or tenesmus. The stools are frequent; commonly from eight or ten to more than double this number in twenty-four hours, and are streaked with more or less blood. They subsequently become less mucous, more watery, and sometimes contain traces of fæculent matter. There is little or no pain in the abdomen between the calls to stool, but often an irksome sensation is felt in the situation of the sigmoid flexure of the colon and of the rectum. The pulse is either very slightly affected, or quick and small; the tongue is generally loaded or furred; and the thirst increased. The appetite is frequently not much, or even not at all impaired. This slightest grade of the disease may terminate favourably in from six to nine days, or it may pass into a *chronic* form. — *Relapses,* and organic changes in the large bowels, sometimes also follow it.

13. (*b*) In its *more severe states,* dysentery is preceded either by diarrhœa, or by disorder of the stomach and bowels; or by nausea, flatulence, constipation, and occasionally vomiting. These

symptoms may be of two or three days' duration, before the characteristic evacuations are observed, or be accompanied or followed by distinct chills or rigors, ushering in increased heat and frequency of pulse. In other cases, very frequent, scanty, mucous, and gelatinous motions, streaked with blood, preceded by gripings and tormina, and attended by straining, at once introduce the disease. Frequently the horripilations or chills continue to alternate for some time, with increased heat, and other febrile symptoms. The pain at first is often limited to the rectum and sigmoid flexure of the colon, occasional griping only being felt in the abdomen. The pulse is slightly accelerated, and the tongue white and loaded. If the disease be not subdued or mitigated in this early stage, the calls to evacuation become more frequent; are preceded by more severe griping and tormina; are attended by greater straining; and are sometimes ineffectual. The tongue is more loaded, and the pulse more frequent and small. In many cases, however, little or no pain is felt, excepting when the patient is about to pass a motion, although the matters discharged are most morbid, and the constitutional affection severe. This, however, is no evidence of the absence of inflammation; for the mucous surface of the large bowels may be inflamed, and even ulcerated, and yet but little uneasiness, unless upon firm pressure, will be complained of. Often, where pain in the intervals between the tormina is absent, a sense of heat in the course of the colon, or of soreness in the abdomen, is felt, and indicates, even more than acute pain, the existence of inflammatory action. As long as disease has extended no farther than to the mucous surface of the large bowels, the patient seldom feels more than the above sensations, or a dull aching pain, not increased on pressure, which he describes as shooting, at times, through the abdomen; but when the region of the cæcum is minutely examined, pain or fulness is generally detected in that situation, even when neither can be felt over the sigmoid flexure.

13. As the disease proceeds, the stools become more frequent, the tenesmus more severe, the discharges of blood greater and more mixed with the matters evacuated, which gradually pass from a mucous, slimy, or gelatinous, to a watery and dark muddy appearance, either with an intimate admixture of feculent matter, or occasionally with hardened fæces, and even with pure and unmixed blood. The tenesmus is now attended by a feeling as if the bowels themselves would pass off; and, in children and delicate persons, *prolapsis ani* not unfrequently occurs. In some instances, as the disease advances, substances resembling fat or pieces of flesh, and consisting chiefly of masses of coagulable lymph, or of the fibrine of the blood poured out in the bowel, come away. The *urine* is now, and often early in the complaint, of a high colour, voided frequently, always with scalding pain, or difficulty; and sometimes the dysuria amounts to strangury, owing to the vicinity of the chief seat of disease. The tongue is at this period loaded towards the base, and its papillæ are excited. The pulse is quick and small; the skin harsh, hot, and dry, especially over the abdomen; the tormina and tenesmus increase, and the calls to stool are more incessant, especially during the night and early in the morning, when the febrile symptoms are also much augmented. The thirst is urgent and the appetite lost; every thing taken to assuage the thirst being followed by tormina, and a desire of evacuation, as if it had rapidly passed through the bowels; and the patient desponds. Subsequently pain becomes more fixed in the hypogastrium, the abdomen more tense, full, or tender; the strength sinks; and dyspnœa sometimes supervenes,—indicating the extension of inflammatory action to the peritoneum. If no amelioration take place before the appearance of these latter symptoms, the pulse becomes more quick and feeble, the extremities cold; the tongue either brown, or dry and hard, or glazed, red, and aphthous; the strength more reduced, the emaciation great; the discharges dark, watery, offensive, cadaverous, and like the washings of flesh; and the spirits dejected. Hiccup sometimes occurs; with delirium, relaxation of the *sphincter ani*, leipothymia, and death, at a period varying from a fortnight to three or four weeks. In other instances, the disease is arrested some time before dangerous symptoms supervene, or is mitigated only, and thence passes into the *chronic* form.

14. Simple dysentery presents every grade of severity between the two now described; and such are the most common appearances which it assumes in this and in temperate climates; but the symptoms often vary much, according to the causes, the age, and strength of the patient; the parts of the canal first affected; the pre-existence of collections of morbid secretions or fæcal matters, the external agents operating during treatment, and the means employed. To some of these *modifications and their pathological relations* it is necessary to advert. When it arises sporadically, febrile action, ushered in by chills or rigors, seldom is observed until the dysenteric symptoms are formed, and is merely symptomatic of the local disease, which may commence in the cæcum, or in the colon and rectum, or in this last, and be there in a great measure limited, or may extend more or less to other parts. Thus patients are frequently affected with diarrhœa, uneasiness and fulness of the abdomen, particularly in the region and vicinity of the cæcum, several days before mucous and bloody stools or straining are complained of, especially when the disease is consecutive of fever; and occasionally they experience tenesmus some days before the disorder is fully formed. In these cases, the progress of affection from the cæcum, or even from the small intestines, along the colon to the rectum, as well as in the opposite direction, may be traced by the symptoms, when the patient comes early under treatment. In other instances, especially those consequent upon fever, and in some epidemics, febrile action may co-exist with, or even precede, the earliest symptoms. It is, therefore, important, in a practical point of view, to ascertain the early seat and extent of morbid action, as well as its constitutional relations; as, together, they furnish the chief basis of therapeutical indications; for, in proportion as constitutional disturbance is great, previously to the formation of the bowel affection, the less should antiphlogistic or depletory measures be relied upon in the treatment. In general, although the straining be severe, and the calls to stool frequent, yet if uneasiness or pain be not occasioned by pressure over the region of the cæcum and sigmoid flexure of the colon, if heat in the course of the colon be not felt, and if tormina be not

violent, nor the abdomen tense or tender, the rectum may be considered the chief seat of the disease; the secretions poured out in the upper parts of the intestinal canal having produced, first, irritation, and afterwards, inflammation of this part. But, if there exist much primary constitutional disturbance, this inference should not be drawn; for, in such cases, the mucous surface of both the small and the large bowels may be seriously affected, and yet these symptoms may not be present in any evident degree. Cases will also occur, characterised by tormina, twisting pains about the umbilicus, borborygmi, tension of the abdomen, more or less febrile commotion, and frequent calls to stool; the evacuations being mucous, bloody, and subsequently watery, &c.; and yet little or no tenesmus will exist. In these, the seat of disease is chiefly the ilium, the cæcum, and upper part of the colon; which often become speedily ulcerated if the morbid action be not arrested. When, in addition to these symptoms, tenesmus is urgent, the rectum and sigmoid flexure of the colon are also affected.

15. In this form of disease, the quantity of matters evacuated from the bowels is extremely various. In severe or advanced cases, from twenty to thirty, or even forty, efforts at stool are sometimes made in the twenty-four hours, and often without any further discharge than a little mucus and blood; but occasionally much serous or watery matter, with broken-down fæces, slime, mucus, and blood, is voided, exhausting and emaciating the patient. In some instances, the evacuations are muco-puriform, more or less streaked with blood, without the least trace of fæces; and in others, they contain scybalæ. It would seem, that the retained fæces are frequently broken down or semi-dissolved by, and mixed up with, the serous and sero-sanguineous fluid exhaled from the irritated mucous surface; and hence the infrequency of scybalæ in many states of the disease. The evacuations are often very offensive from the commencement, but as frequently they are not manifestly so. They generally become fœtid, or have a peculiar raw cadaverous odour in the last stage of the worst cases; especially when portions of the mucous surface are sloughed off. They are sometimes of a singularly variegated hue; consisting of glairy mucus, with a greenish or gelatinous substance, resembling morbid bile; seldom with pure bile; often without any trace of this secretion; occasionally with large pieces of albuminous concretions of coagulated lymph or fibrine, formed upon the internal surface of the bowel, and afterwards detached; and either with streaks of fluid blood, or with small dark coagula. When the blood is in large quantity, and is fluid and distinct from the other matters, it is evidently poured out by the lower parts of the large bowels. When consisting of dark grumous clots, intimately mixed with the discharges, it probably proceeds from the cæcum, or upper portion of the colon. It may, or may not, even when most copious, depend upon ulceration; but it most commonly is exuded from the irritated mucous surface, especially early in the disease. It may be very abundant, even at this stage, and continue so till death, particularly in drunkards; or it may be trifling throughout; or be copious only at the close of the disease.

16. The state of the *abdomen* also varies. In some, tension with fulness, proceeding generally from fæcal accumulations; and flatus is much complained of from the commencement. In others, the abdomen is natural in size. *Pain* and tenderness on pressure are uncertain symptoms in the early stage of the disease. When it is fixed in one place, we should suspect inflammation or disorganisation to be proceeding there. It is, in the plethoric, most frequently complained of in the hypogastrium and region of the cæcum; and it may often be traced up the right side and in the course of the colon. Often there is little or no pain, nor even soreness; the patient bearing pressure without expressing any uneasiness, and yet, upon examination after death, the morbid appearances will be as extensive, in respect of the inner surface of the bowel, at least, as in those who complained of the greatest pain; the chief difference being in the more complete limitation of the lesions to the mucous surface in those cases wherein no pain was felt. It is chiefly in the last stage, when inflammatory action has extended to the serous surface of the bowels, that fulness, pain, and tenderness of the abdomen have been complained of.

17. (*c*) *Hyper-acute dysentery*, or *dysentery in Europeans removed to warm countries*, is generally *occasioned* by a too rich and stimulating diet, and a regimen entirely unsuited to the climate; by the too free use of ardent and intoxicating liquors; by exposure to the night air, or to cold and moisture; and by the endemic and other causes mentioned above (§§ 9, 10.). It often assumes the severe character now described; and, in persons who are plethoric, who have neglected their bowels, have lived highly, or are of a phlogistic diathesis, or who possess rigid fibres and great irritability, it puts on a still more violent or a *super-acute form*. In them, the sense of heat and soreness; the tormina, fixed pain of the hypogastrium, the tension of the abdomen, the continual calls to stool, and the straining, are most distressing. The region of the cæcum is full and tender. The tongue is white, loaded, excited; sometimes clean and natural, but afterwards dry. The skin and pulse are frequently, at first, and for some time, very little affected; the constitutional disorder not being commensurate with the severity of the local symptoms; but the former subsequently becomes dry or hot, and the latter quick, hard, and small. In many cases, the disease begins as common diarrhœa; in others, it comes on suddenly, and rapidly reaches its acmé; and then the thirst is excessive; the urine scanty, voided with great pain, or altogether suppressed; the testes drawn up to the abdominal ring; the stools mucous, slimy, streaked with florid blood, sometimes attended by *prolapsus ani*, and rapidly passing to watery, serous, or ichorous discharges, resembling the washings of raw beef, in which float particles, or even large shreds of coagulable lymph, thrown off from the acutely inflamed surface, often with copious discharges of blood. Great depression of spirits, nausea, vomiting of bilious matters, and distressing flatulence or borborygmi, which aggravate the tormina, are also present, and, in many of the fatal cases, continue to the last. In some of these the inflammatory action extends to the submucous coats, and detaches portions of the mucous tissue, which come away in the stools, in the last stage, or even hang from the rectum; any effort

to withdraw them occasioning a remarkable increase of suffering. The constitutional disturbance has now become very severe, and a fœtid or cadaverous odour proceeds from the patient. Detached portions of the mucous membrane will be recognised by their sloughy appearance; by the ichorous character and putrid smell of the discharges which contain them; and by the period at which they are observed, the albuminous exudations that resemble them being thrown off at an earlier stage.

18. In somewhat less violent and more protracted cases, especially as the disease approaches an unfavourable close, the motions are sometimes streaked with a puriform sanies, or with a whitish, opaque, or greyish matter, apparently depending on ulceration; and they frequently are involuntary, owing to the paralytic state of the sphincter, the anus being excoriated, livid, relaxed, and widely open. The surface of the body, also, is shrunk, occasionally yellowish; the superficial veins deprived of blood, and the extremities moistened with a cold sweat. At last, the patient is affected by leipothymia, or stupor, or by delirium, and other nervous symptoms, and dies in from four, five, or six days, to three weeks, unless the disease is of a milder or more chronic form, or is arrested by treatment.

19. In Europeans, long resident in an intertropical or hot country, the disease assumes either a less inflammatory form than the preceding, or some one of the asthenic states about to be described; it also frequently becomes chronic in them, and is often consequent upon, or associated with, ague, remittent fever, or with diseases of the liver, spleen, and other abdominal organs. (See § 20. *et seq.*, and *Complications.*)

ii. THE ASTHENIC FORMS OF DYSENTERY.

CLASSIF.—III. CLASS, XI. ORDER (*Author*).

20. DEFIN.—*Depression of the organic actions; of the tone of the circulating, nervous, and muscular functions, preceding or accompanying the occurrence of tormina and tenesmus, with mucous, bloody, and offensive stools, and giving rise to fœtid exhalations, and infection in confined places and predisposed persons.*

21. The asthenic forms of the disease have been variously denominated, according to the more prominent features assumed by them under certain circumstances, endemic as well as sporadic, and especially in different epidemics. Whilst the foregoing states are generally attended, especially in their early stages, by sthenic vascular action, those about to be noticed are usually characterised by *fever*, of a low, nervous, or adynamic kind; by greater prostration of the constitutional powers than the preceding; by an earlier manifestation of febrile commotion or constitutional affection, which may even precede the dysenteric symptoms; and by a much more remarkable affection of the whole economy: and while the above forms are generally sporadic, sometimes endemic, and seldom epidemic or infectious, those about to be described are commonly epidemic and infectious, under circumstances favourable to this mode of propagation; sometimes endemic; and more rarely sporadic, excepting in the darker races of the species, in which it is extremely apt to become infectious, when occasions promote its spread in this manner.

22. *A.* CAUSES. — (*a*) The *predisposing causes* of the asthenic forms of dysentery are, chiefly, epidemic states of the atmosphere; cold and variable weather after long heats, or after hot and moist seasons; prolonged heat and humidity; accumulations of morbid secretions in the *prima via;* a cachectic habit of body; deficient and unwholesome food; pre-existing debility, especially that caused by low fevers; an impure and miasmatous state of the air, especially when connected with humidity; worms in the *prima via;* and the predisposing causes already enumerated (§ 9.).

(*b*) The *exciting causes* are, famine or prolonged fatigue; exposure to a moist cold; the excessive use of intoxicating liquors; exhalations from animal and vegetable matters in a state of decay; the use of marsh, stagnant, or river water holding decomposed animal and vegetable matters in solution, or containing, either with or without these, animalculæ and minute insects, or of brackish waters; the flesh of diseased animals, or meat kept too long, or tainted; stale fish; blighted, unripe or ergoted rice, rye, &c.; unwholesome or insufficient food; breathing the stagnant or infected air of low, crowded, and ill-ventilated places, especially when a case of the disease occurs in such circumstances — as in hospitals, camps, prisons, ships, barracks, &c.; and the exhalations proceeding from the discharges, and from the sick, either confined and concentrated in a stagnant, or floating in a warm, moist, miasmatous, or epidemic atmosphere. But there is reason to suppose, that the concurrence of two or more of the causes enumerated in connection with the sthenic states of the malady will also produce some one of its asthenic forms, during certain conditions of the air which have been called epidemic, especially in persons of a weak frame and depressed vital and mental powers. The least energetic, also, of the above causes, acting on persons already affected by the preceding form of the disease, will convert it into some one of the asthenic states. Owing chiefly to the diversity of the exciting causes, to their concurrent operation, and to the difference in the state of constitutional predisposition, &c. are to be imputed the modifications which the disease presents when epidemic, or at different seasons.

23. *α.* Of the influence of exhalations from animal bodies in a state of decomposition, in causing the low forms of dysentery, I could produce, if my limits would permit, numerous proofs. One of the authors of the article *Dysentery*, in the *Dictionnaire des Sciences Médicales*, states, that, having been detained on horseback in a field of battle, in August, 1796, where several hundred men and horses lay in the first stage of decomposition, he was seized with a dangerous dysentery on the following day; that three out of four of those who accompanied him were similarly infected; and that his horse died of the same disease soon after. Similar facts are adduced by ZIMMERMANN, OSIANDER, DESGENETTES, and others. Of the agency of impure water, in producing dysentery, proofs are likewise numerous. I have myself seen several instances, in a warm climate, where it was the cause of the disease being endemic there. In temperate countries, waters containing decayed animal matters, or an excess of uncombined alkali, cause diarrhœa more frequently than dysentery, or the former passing into the latter. But in warm climates, especially where water is collected and

preserved in tanks, and in autumn, after warm summers, in colder countries, dysentery is the most common result. The water of the Seine at Paris, from this cause, often produces the disease; and Dr. M. BARRY states, that such of the inhabitants of Cork as used the water of the river Lee, which receives the contents of the sewers, and is, moreover, brackish from the tide, are subject to a very fatal dysentery; and that, at the time to which he especially refers, at least one in three of those affected died of it. I have no doubt that the dysentery epidemic in London, during several successive autumns after the great plague, was owing to the same causes, as well as to the exhalations from the burying-grounds, which received the bodies of those who died of that pestilence; and that the prevalence of the disease in besieging, as well as in besieged armies, is caused by the exhalations from the decomposition of the dead; by the impure state of the water, from decomposed animal matter carried into it; by night exposure; irregular living, deficient food or clothing, and the other contingencies on encampments and operations in the field; and by crowded and ill-ventilated barracks, &c. The frequent occurrence and fatality of dysentery in fleets, in former times, evidently arose from the putrid state of the water, and the foul and stagnant air between decks, sometimes breathed by several hundred persons. During the slave trade, dysentery was, and even now is, among the numerous small vessels engaged in this disgusting traffic, the chief pestilence; one half of those conveyed in these floating receptacles of misery, on some occasions, having died of it during the passage across the Atlantic. It may be here mentioned, that the dark races, particularly negroes, are more liable to dysentery than to any other disease; that it assumes an extremely low or putrid form in them, when confined in ill-ventilated situations; and that, when a number, even of those in health, are shut up in such places, the cutaneous secretions, which are so abundant and offensive in these races, accumulate in and vitiate the surrounding air, so that if it be not frequently renewed, the systems of those thus circumstanced are thereby infected, and, instead of an infectious typhus, which would be the result in the European constitution, a putrid dysentery, spreading rapidly through all breathing the impure air, is developed. I had, in 1817, an opportunity of witnessing what I now state. The disease is considered by the native Africans as infectious as small-pox, and is dreaded by them equally with it; these two being the most fatal diseases to which they are liable.

24. *β*. The *contagion* of dysentery has been much disputed; chiefly owing to the circumstances of the different forms of the disease not having been distinguished with any degree of precision, and of the loose notions attached to the words contagion and infection, by those who espoused different sides of the question. In the article INFECTION, these terms, and their true value, are attempted to be estimated with more precision than heretofore. As respects this malady, it may be stated, as the result of observation and acquaintance with what has been written, that the sthenic forms are seldom or never infectious — and chiefly for this reason, that the circumstances in which they occur are unfavourable both to the generation of infectious emanations, and to their accumulation, concentration, and operation in healthy persons — that, in short, they, like all other sthenic maladies, do not evolve infectious effluvia, because the vital energies are not depressed nor perverted to such a degree, even in their advanced stages, as to give rise to the depravation of the circulating and secreted fluids requisite to the production of infectious emanations, these changes taking place only when some one or more of the causes which produce these effects — the causes of the asthenic states — come into operation; — that febrile diseases, attended by depravation of vital power and of the fluids, evolve effluvia capable, under favourable circumstances, of infecting or contaminating those disposed to be impressed by them; — and that, as the asthenic forms of dysentery are characterised by these properties, and as the emanations disengaged in their advanced stages become cognisable to the senses, as well as by their effects, it must be inferred, that these forms are infectious on occasions favourable to the action of the emanations which proceed from them. These inferences, founded on an important pathological principle, are confirmed by enlightened and most numerous observations; and, independently of such confirmation, this principle must be shown to be unfounded before the inferences drawn from it can be denied. Thus it will appear that the great difference of opinion that has existed on this subject is to be referred, first, to the fact that certain states only of the disease are infectious, and these chiefly in circumstances favourable to the development and operation of the infectious emanation; and, secondly, to the incorrect notions entertained respecting contagion and infection; many believing, because the disease is not propagated by mediate or immediate contact of the diseased person, or of a palpable secretion or virus, that therefore no contagion nor infection is produced by it. But the spread of dysentery very closely resembles that of scarlatina or measles, which cannot be propagated by inoculation, or by the application, either direct or indirect, of the morbid secretions to a confined part of the external surface; and yet the effluvium from the sick or the fæcal evacuations, floating in a close or stagnant air, will readily induce the disease, in persons who, constitutionally, or from the influence of concurrent causes, are disposed to it, and who breathe the air thus contaminated. In such cases, the effluvium operates, as in other infectious diseases, chiefly through the medium of the respiratory organs; the system being affected, although not very manifestly, before the dysenteric symptoms are developed. Several respectable authors, however, have conceived it to be propagated, when persons repair to the water-closet or night-chair used by dysenteric patients, by the action of the infected air or effluvium upon the anus, the affection extending upwards, along the rectum. HUFELAND and some others state, that they have seen the complaint communicated by the pipe of an enema apparatus. But, in most of the instances of the infectious disease that I some years ago had an opportunity of seeing, constitutional disturbance, and often diarrhœa, preceded the fully-formed dysentery.

25. *B*. FORMS AND SYMPTOMS. — *a*. *The simple sthenic* or *adynamic dysentery*. This variety is one of the most common, particularly in this country. It may occur sporadically in delicate persons,

owing chiefly to the more debilitating causes assigned above. It is also frequently epidemic, especially among the poor in times of scarcity, and after very wet and warm seasons; it often follows attacks of adynamic fevers, or prevails at seasons when they are prevalent. It was epidemic in Glasgow in the autumn of 1827; and is described by Mr. Wilson, Mr. Brown, Dr. Macfarlane, and Mr. Weir (*Glasgow Med. Journ.* vol. i. pp. 39. 48. 99. 223.) It generally commences with diarrhœa, succeeding a constipated state of the bowels; and very frequently, especially in the more severe cases, coldness, chills, or rigors are observed, attended by griping pains about the lower part of the abdomen, with frequent calls to stool; and sometimes followed by fixed pain in the hypogastrium, particularly at its right and left sides. Want of appetite, increased thirst, furred tongue, clamminess of the mouth, and acceleration of pulse, usually are superadded. As the disease becomes fully formed, the pulse is more or less frequent, small, weak, and soft; the skin is sometimes but little warmer than natural, or only hotter over the abdomen: it is commonly harsh and dry. The countenance is pale, shrunk, and anxious; sickness and vomitings occasionally occur; and singultus is not infrequent in the latter stages, when the tongue, from being white, slimy, furred, and yellowish, generally becomes red, glazed, and chapped, and occasionally dark red and dry. The stools sometimes are not mucous, slimy, or bloody, although very frequent, until the second, third, or fourth day; but, in other instances, they present these characters from the first. They are always of this description as soon as chilliness or rigors are felt. The evacuations vary greatly in frequency and quantity; but they are generally characterised by a deficiency of bile, by great fœtor, and by the absence of scybala, excepting in a very few cases. Remissions of the symptoms, and of the urgent calls to stool, often occur about the middle of the day. The tormina and straining are sometimes followed by prolapsus ani, especially in children and delicate females. In a few instances, a puriform fluid is voided towards the close of the disease. The urine is usually scanty, passed with pain, and rarely retained. This is the least infectious of any of the states of the disease comprised under this species; unless in close and crowded places; and then it manifests this property, and passes into some one of the states next to be described, particularly the typhoid.

26. *β. The nervo-adynamic, or typhoid.*— Asthenic dysentery sometimes appears in a modified form under certain circumstances, especially where numbers are collected in a close and impure air, as in barracks, garrisons, crowded ships, &c.; and in years of scarcity among the poor. The patient complains at first of general depression, vertigo, violent headach, increased sensibility to light, pains in the limbs and joints, and of gripings and purgings; followed by anxiety at the præcordia, stupor; foul, clammy tongue and mouth, which soon becomes dry and covered by a brownish coating; a penetrating, offensive odour of the breath; and intense thirst. The pulse, at first, is very quick and small; and, afterwards, weak and irregular. The stools are, from the commencement, very frequent, in small quantity, preceded by tormina and tenesmus; and glairy, or serous, very fœtid, and contain more or less dark blood. The urine is scanty, thick, and dark-coloured. About the fourth or sixth day, a miliary eruption, or petechiæ, sometimes appear about the neck, breast, arms, or abdomen; and, occasionally, epistaxis occurs, between the fourth and eighth days, in young and robust subjects, but without becoming critical. The intensity of the tormina and tenesmus generally diminishes with the progress of the disease; and often, about the ninth or eleventh day, is replaced by a colliquative diarrhœa. The stupor is now attended by low delirium; the soft solids waste and become flaccid; the surface assumes a dirty hue; and an offensive penetrating odour issues from the body and the evacuations. If not ameliorated, or arrested in its progress, this form terminates fatally from the sixth to the twenty-fourth day, the symptoms described (§ 13. 18.) as indicating a fatal issue supervening. Such are the characters it usually assumes; but they are modified by age, constitution, and concurrent causes. It is less frequently epidemic than the other asthenic states, but is more evidently infectious than they.

27. *γ. The malignant, or putrid.*—This form is most common amongst the poor, especially in years of scarcity; in soldiers, during campaigns; in besieged towns, and in countries laid waste by war, &c. It also arises from the existence of endemic causes in full force, especially those which occasion malignant fevers — as animal and vegeto-animal exhalations floating in a warm and moist air; foul water, and other septic agents. It usually *commences* with a general feeling of debility, lassitude, and aching pains, referred particularly to the limbs and joints; with anorexia; foul, loaded tongue; sometimes nausea, borborygmi; relaxed bowels; pale, sunk, or anxious countenance; giddiness; and with a small, soft, frequent, and sometimes slow or natural pulse. To these supervene griping pains in the abdomen, followed by foul, offensive, scanty, and bloody stools; sometimes without tenesmus, particularly at first. Horripilations, or chills, rarely rigors, sometimes occur, at irregular intervals, during the early progress of the disease; but they are often absent. The mental energies are greatly depressed, especially as the disorder advances; when the tongue, which was moist and slimy, becomes covered by a dark, mucous, or fuliginous sordes; the breath is fœtid; and a dark mucus occasionally collects about the sides of the tongue and on the lips; or aphthæ form in this situation. Tenesmus is now complained of; and the stools are cadaverous, watery, dark, and bloody; the soft solids flaccid; and the skin harsh, dry, and of a sickly, dirty, sometimes approaching a yellowish, hue. The patient afterwards sinks into a state of complete apathy; but stupor or delirium seldom comes on until shortly before dissolution: the position in bed is supine; the dejections are involuntary, frequent, and mixed with dark blood, often followed by syncope or leipothymia; the temperature of the extremities sinks rapidly, whilst it continues much higher over the abdomen; the urine is scanty, dark, and fœtid; and the body exhales an infected odour. Anxiety at the præcordia, singultus, and difficult deglutition supervene; and the patient sinks in from five to sixteen or twenty days, according to the violence of the symptoms. This form of the disease is frequent in the most miasmatous

localities in hot climates, both among natives and seasoned Europeans, particularly when remittent fevers are prevalent or malignant; and it occasionally assumes a remittent type, when it may be be prolonged to twenty-eight or thirty days. I saw many cases of it in Africa, in 1817 and 1818.*

28. δ. *The bilious adynamic.* — When bilious, remittent, and gastric fevers are prevalent, a form of dysentery often also prevails, very nearly resembling the first or simple variety; and differing from the foregoing or third form, chiefly in presenting more evident attempts at vital and vascular reaction than it. The present variety sometimes appears, sporadically, in autumn and winter; it is often endemic, in hot climates, among Europeans, arising from the same causes as endemic fevers, aided by cold and moisture; and it occasionally prevails, or becomes epidemic, in temperate countries, during autumn and the beginning of winter, especially after hot summers. This and the immediately preceding variety frequently co-exist, in the same localities, in warm climates, or after hot seasons in temperate countries: this, in the plethoric, sanguine, and robust; that, in the debilitated, ill-fed, and weakly constituted. Bilious adynamic dysentery is generally *caused* by a less intense operation, relatively to the powers of the constitution and to the predisposition, of the same exciting causes, particularly such as are endemic, as those which occasion the malignant form. I have seen it prevalent in Europeans, in warm climates, in the same locality and in the same season as when that form was most destructive in the dark races. Many epidemics recorded by authors belonged to the present variety; although, during an epidemic dysentery, more than one form or state of the disease will be met with, owing to the different circumstances, intrinsic and extrinsic, as respects those affected, in which it will occur.

29. This variety generally *commences* with bilious or serous diarrhœa, which may continue for several days; with debility, pain in the forehead, vertigo, and a mucous yellow coating on the tongue. To these supervene horripilations, chills or rigors, tormina, very frequent calls to stool, a sense of scalding at the anus, and tenesmus. The chills often return during the early stages, and are followed or accompanied by a frequent, hard, or irritable pulse, great thirst, and an acrid heat of the trunk, especially over the abdomen. Nausea, sometimes vomiting, want of appetite, loathing of animal food; a sense of heat in the abdomen; fulness in the seat of the cæcum; pain above the pubis; complete prostration of strength, referred chiefly to the spine and lumbar region; and scalding on the passage of urine; are commonly present at an early period. The pulse, from being quick and irritable, becomes soft; subsequently, small, irregular, and very weak. The stools sometimes continue copious and yellowish for two or three days; but they are usually streaked with blood at the time when tormina and tenesmus are complained of, or soon afterwards. As the disease advances, the blood is more abundant: either mixed with the stools, or fluid and distinct, or in large coagula, and usually of a dark colour; and the abdomen becomes tense, or tumid and tympanitic. The frequency and the quantity of the stools vary greatly; but the distress and tormina are worst at night, the abdominal pain and uneasiness occasionally remitting in the morning, or subsiding for a short time after each evacuation. The odour of the discharges is, from the first, fœtid; and, in very severe cases, it becomes putrid and cadaverous. With the progress of disease, emaciation proceeds rapidly, the surface being harsh, and of a dirty appearance. Towards an unfavourable state, the temperature sinks; the tongue being dry, dark-red, or raw; and anxiety, restlessness, singultus, delirium, leipothymia, with other symptoms described as characterising the last stage of the preceding variety (§ 27.), supervene. This form is seldom prolonged beyond twenty-six or thirty days; unless it assumes a milder aspect in its progress, when it often passes into the *chronic* state. It is frequently epidemic after hot and moist seasons.*

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* Most of the crew of the ship in which I was a passenger to that country were treated by me, for seasoning and remittent fevers, soon after their arrival. They all recovered before I reached my destination. The vessel subsequently went in pursuit of traffic up one of the rivers in the bay of Benin, where the crew there became ill of this form of dysentery; of which all died excepting the second mate and carpenter, whom I chanced, long afterwards, to meet in England. Not one third of the crews of the many vessels that proceed up these rivers survive this disease and fever. The men, who are often deceived into undertaking the voyage, have not even the benefit of medical aid; for none of these vessels is provided with, or is within reach of, this kind of assistance.

* Epidemic dysentery often presents various modifications, in respect both of violence and of the occurrence of phenomena not commonly observed. Of these latter, the most frequent are burning pains or great heat in the abdomen; whilst the extremities and surface are cool or even cold, and the pulse sometimes not much affected; boulimia; very copious, mucous, bloody, or gruelly and frothy, or, more rarely, oleaginous, evacuations; great weakness of the lower extremities; gangrenous eschars; a parchment-like or scaly state of the skin; hæmaturia, or entire suppression of urine; an aphthous state of the mouth and throat; retraction of the abdomen, or the great tension, fulness, or meteorismus of this cavity; frequently the excretion of worms in the stools or by vomiting; miliary, petechial, phlyctenous or tubercular eruptions on the trunk; catarrhal or pneumonic symptoms; and rheumatic pains in the muscles and joints. Generally, as the quantity of fluid matters evacuated from the bowels are increased, the excretions by the kidneys and skin are diminished. In most epidemics, especially those of the asthenic forms, constitutional symptoms, characterised by lassitude, debility, foul tongue, disordered state of the stomach and bowels, unhealthy aspect of the countenance and skin, and weak, quick, and soft pulse, with evident disorder of the circulating and secreted fluids, precede the pathognomonic symptoms, which appear after these have continued a longer or shorter time. It will be instructive to review the characters of, and the remedies employed in, those epidemics of which we have authentic accounts, as valuable illustrations of the nature and treatment of this destructive malady will be thereby furnished. It will, moreover, appear, even from the very meagre account to which my limits oblige me to confine myself, that our knowledge of the disease, even at the present day, is but little in advance of what existed two centuries ago; and that even the most recent writers on the subject are distinguished rather by confined or exclusive ideas as to its nature and treatment, than by comprehensive views of its forms and manifestations, as well as of the means of removing it, in connection with the various combinations of causes producing it, and the diversified circumstances in which it prevails. Exclusive notions of a disease are the result of a knowledge merely of what has occurred within the sphere of the author's observation; whilst more extended ideas are acquired from what he has remarked in various climates, on different occasions, and at distant periods, and from an acquaintance with what has been observed by others: believing, truly, that nothing is constant but change; that what has occurred or prevailed formerly will recur again; and that one form is as likely as another to appear in future, whenever the concurrence of causes, of which it is a necessary or contingent result, shall take place.

1. Gregory of Tours states that dysentery ravaged the whole of France in 334.

2. Its destructive effects in the army of Henry the Fifth, before and after the battle of Azincourt, are well known.

30. ε. *In the Dark Races*, dysentery is perhaps the most prevalent and fatal disease; and in negroes it generally takes the place of fevers; being, in the language of Sydenham, a low fever turned

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3. Fernel says, that, in 1538, it was so general through Europe, that neither village nor town escaped, although the seasons had been regular.

4. Camerarius observed it, in the autumn of 1583, in Germany, where it was malignant and destructive. The preceding summer had been hot and dry.

5. Zacutus (*Curat.* cent. iii.) notices an infectious and destructive dysentery in Lisbon, in 1600, for which fumigations were employed.

6. Lammoniere describes it as it occurred in Lyons, in 1607, 1624, and 1625, where it had been imported with the troops from Italy. In proof of its infectious nature, he states that the medical attendants and nurses were nearly all attacked. Marks of inflammation and gangrene were found from the pylorus to the anus, the liver and omentum being also disorganised.

7. Sennert (*Méd. Pr.* l. iii) mentions an epidemic which pervaded all Germany in the summer and autumn of 1625; and Hoffmann states, that it reappeared in autumn 1626, after a wet and warm spring, and a dry and hot summer; that it was contagious; and was best treated by bleeding at the commencement, in some cases, by laxatives and demulcents, by nitre and absorbents, and by milk with Seltzer water.

8. Diemerbroeck records, that the disease was most fatal in Brabant, in 1635, then the seat of war. It first appeared amongst the troops, and afterwards among the inhabitants. The prostration of strength was great; and infection was proved by the attendants having been all affected. The most successful remedies were rhubarb, and, afterwards, one or two drachms of wax melted in warm milk.

9. Bartholin relates, that a malignant dysentery succeeded to ague in Copenhagen, in 1652, and carried off many thousands. The odour of the evacuations was most offensive.

10. The plague of London, in 1665, was followed, in the autumn of 1666, by an epidemic and infectious dysentery. Morton was attacked, and escaped with difficulty. It appears to have been occasioned by the infected air emanating, in the summer, from the numerous bodies buried in and about London during the preceding year. The fatality was very great; and cinchona seemed to have been the chief remedy.

11. In an epidemic described by W. Wedel (*Act. Nat.* dec. ii.), and which occurred, in 1669, at Gotha, the evacuations were fœtid and sanguinolent; and yet, in many instances, unattended by pain or tormina. Those in whom the tormina was most severe, recovered; but those who experienced no pain, died suddenly, the disease having passed rapidly into gangrene.

12. Sydenham states, that the cholera which prevailed in London, in the summer of 1670, having ceased, dysentery took its place. The disease commenced with chills or rigors, followed by increased heat. The treatment was directed to remove inflammation, and evacuate morbid humours.

13. Brandt notices the occurrence of dysentery, in an epidemic form, in the Danish army, and in Copenhagen, in the summer of 1677; and attributes it to the use of stagnant water and of bad beer, and to an atmosphere loaded with impure exhalations.

14. Dysentery prevailed in Zurich in August, in 1680, after a hot summer. It appears from Muralto to have been of an inflammatory type.

15. An epidemic, observed by F. Hoffmann, in 1684, in Westphalia, was also inflammatory. Favourable cases terminated by the fourteenth day; those that were prolonged beyond it, generally terminated unfavourably. Persons in communication with the sick were infected. Bleeding at the commencement, and nitre with camphor, were the chief remedies: astringents and stimulants were injurious.

16. Loescher states that the epidemic dysentery of 1709, in Misnia, was attended by acute fever, petechiæ, lividity of the countenance, meteorismus of the abdomen, and depression of strength and of the pulse; followed, in many instances, by delirium, convulsions, and death. Clysters, ipecacuanha, laudanum, and sometimes bleeding, were employed.

17. In August, 1718, the disease appeared, in a malignant form, among the Prussian military in Berlin and Pomerania, and extended to the inhabitants. Aphthæ were a common and an unfavourable symptom. A change usually occurred towards the fourteenth day. Relapses were fatal. Evacuants and diaphoretics, followed by tonics and antiseptics, were the most successful means.

18. Margraaf details the history of an epidemic which, in some cases, was mild and remittent; but, most commonly, of the bilious-adynamic and malignant forms. Ipecacuanha was the most useful medicine.

19. A similar visitation took place at Nimeguen, in 1736 (Degner). The malignant cases were frequently fatal on the third or fourth day, and were contagious. Ipecacuanha, rhubarb, and, subsequently, simarouba, were chiefly confided in.

20. Dysentery was epidemic in Plymouth, in 1744 (Huxham), in an inflammatory form. Early bleeding, ipecacuanha, rhubarb, and, at the close, opiates, were the chief remedies.

21. It prevailed in Zurich, in 1747, and was attributed to bad water (Gruber). Diaphoretics, emollients, opiates, and tonics were most generally prescribed.

22. It was the most destructive disease in the British army in Holland, in 1748; and was acutely inflammatory, often rapidly terminating in gangrene (Grainger, &c.). Bleeding, emetics, and purgatives were employed.

23. The epidemic, in several parts of France, in 1750, was chiefly of the simply asthenic and malignant forms. Astringents were injurious, evacuants, emollients, and antiseptics being most serviceable (Marteau and Navier).

24. That which occurred in Hanover (Lentin) was attended by a burning heat in the abdomen, without much attendant general fever; and by fœtid or purulent stools. Antimony, rhubarb, mucilages, and, afterwards, simarouba or copaiba in the yolk of egg, were usually directed.

25. Strack states that the French army brought with them, and communicated to the inhabitants of the parts of Germany through which they passed, in 1757, dysentery of a malignant form; which was entirely similar to the description I have given of that variety. It was also prevalent in various other quarters of Germany. Women in the puerperal state, and their infants, were also attacked. Ipecacuanha, followed by rhubarb, the tartrate of potash, and, lastly, simarouba, was chiefly employed. The too early use of astringents, absorbents, and narcotics were said to have been dangerous. Isolation of the affected, and lime, as a disinfectant, were resorted to.

26. Dysentery was epidemic, in the autumn of 1760, in Gottingen; and of an inflammatory and asthenic character, the local inflammatory action being attended by deficient vital power. The cæcum and rectum were ulcerated and gangrenous. Bleeding, vomits, laxatives, emollients, and antiseptics, with opiates and bark, were principally trusted in (Roederer).

27. According to Grimm, the same epidemic was observed in Thuringen, where it was infectious. A similar treatment to that now stated, with the addition of camphor, was adopted.

28. Leclerc describes the dysentery to which the Tartars of the Ukraine were subject, in consequence of a meagre and indigestible diet, consisting of much salted or smoked fish and meat, and the use of ardent spirits. It seems to have been simply asthenic or malignant; and to have been most successfully treated by ipecacuanha, rhubarb, nitre with camphor, opium, mucilaginous clysters; and, in the last stage, balsam of tolu, &c. *Procidentia ani* was cured by conveying to the part the vapour from turpentine thrown upon burning coals.

29. Dysentery succeeded, in July and August, to the catarrh which prevailed in London in 1762; attacked chiefly the poor and children; and assumed the bilious adynamic form. Bleeding, at the beginning, in the more inflammatory cases; emetics and diaphoretics; laxatives and emollient injections; mucilages and astringents, &c., were successively prescribed (G. Baker).

30. This disease also followed catarrh, at Vienna, in the autumn of 1763 (De Mertens); and was attributed to cold and moisture consequent upon great heat. Bloodletting was borne by very few. Ipecacuanha, rhubarb, mucilages, and, afterwards, bark, were exhibited.

31. The epidemic in Berne, and adjoining parts, in autumn, 1765, was in all respects the same as that which I have denominated the bilious adynamic, according to the description of Zimmermann; who states it to have been infectious in circumstances favouring the action of this property; and that females, far advanced in pregnancy, in some instances gave birth to infants affected by it. Ipecacuanha emetics, gentle purgatives, diluents and emollients, mucilaginous enemata; subsequently, camomile tea and opiates, were chiefly confided in: astringents were injurious.

32. In an epidemic observed, in the same year, by M. Cheyssiol, camphor, blisters, sinapisms, dry-cupping, and cinchona were most beneficial.

33. According to Dr. Sims, the disease was very prevalent in London in the autumn of 1768; it having succeeded rheumatism, and continued during 1769 and 1770. One form proceeded chiefly from cold, was ushered in by rigors, and required bleeding and ipecacuanha emetics. The second and most common form prevailed among those who lived on poor diet. The pulse was low, quick, and unequal; the skin cold; the face pale and haggard; and the stools fœtid and putrid. In this, ipecacuanha, opium, astringent bitters, bark, aromatics, and claret, proved most successful.

in upon the bowels. It commonly *arises, sporadically*, from cold and moisture — from suppression of the function of the skin, which is in them a much more important excreting organ than in the

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34. Malignant dysentery was prevalent in Jamaica, in 1771. Dr. Wright found antiseptics, especially a saturated solution of common salt in lime-juice, taken in aromatic or sweetened water, most serviceable.

35. MM. Maret, Durand, and Caile state, that the epidemic throughout France, in the autumn of 1779, was an illustration of the aphorism of Hippocrates,—"Hiems sicca et aquilonia, ver autem pluviosum et australe; necesse est fieri febres acutas et dysentarias maxime,"—and assumed an inflammatory, bilious, and malignant form; the second and third being very infectious. In many places, children, females, and the aged were principally affected. Blood-letting, which was repeated in some cases; laxatives, with tamarinds and manna; mucilages and emollients, in the form of drink and in clysters; camphor and anodynes, lime, and gum-water; cinchona, with camphor and the anodyne liquor, were prescribed according to the form and stage of the disease.

36. Birnstiel records that diarrhœa prevailed, in the spring and summer of 1780, on the Rhine; and was followed, in autumn, by a violent dysenteric epidemic of a bilious adynamic form — the symptoms being entirely the same, but more intense than I have described them. Evacuations by ipecacuanha and rhubarb, mucilages and diaphoretics, and, towards the close, cascarilla and opium, were confided in.

37. In the years 1785 and 1786, the disease, in simply asthenic and malignant forms (§ 25. 27.), was general through the Venetian states — chiefly in females and children (Capovilla). Fomentations, mucilaginous injections, emollient drinks, ipecacuanha, rhubarb, almond oil, absorbents, and, afterwards, cinchona, wine, opiates, and astringents, were most beneficial.

38. The epidemic in Champagne, especially in the French, Prussian, and Austrian armies, during the autumn of 1792, assumed inflammatory, bilious, malignant, and typhoid forms, according to the causes and circumstances in operation; and was remarkably fatal among both men and horses (Chamseru). Bleeding in some; ipecacuanha, antimonials, emollients, cinchona, rhubarb, tamarinds, lemonade, &c., were principally employed.

39. The dysentery that prevailed in the army of Italy (Desgenettes) was rarely inflammatory; but very generally malignant, arising from endemic causes concurring with extreme fatigue and exposure. Aromatics, vegetable acids, and opiates; antiseptic and anodyne enemata, cinchona, and simarouba, were most frequently prescribed.

40. Hufeland states that it was epidemic at Jena, in 1795, in the simply asthenic and malignant forms. He treated it most successfully by ipecacuanha and extract of nux vomica. It was infectious in favourable circumstances.

41. Schmidtmann states that dysentery was epidemic, through the north of Germany, in 1800; and so prevalent in the town in which he resided, that very few escaped. It assumed inflammatory, bilious, nervous, and malignant forms, according to circumstances, and the constitution, &c., of those affected. Bleeding in some cases; gentle emetics in others; opium nearly in all; and camphor, decoction of bark, various astringents, tonics, and antiseptics were employed. Arnica was given in the malignant cases, but with little benefit; and tamarinds, cream of tartar, manna, or other mild purgatives, were also exhibited.

42. Dysentery, chiefly in the bilious-inflammatory, passing into the adynamic form, was remarkably prevalent and fatal, at the Cape of Good Hope, in 1804 (Lichtenstein); and was often associated with inflammation and structural change of the liver. This epidemic was at first very injudiciously treated by stimulants, astringents, and antispasmodics; and one in four died. The mortality was subsequently reduced one half, by means of small doses of calomel and opium, given every hour or two; sometimes with camphor and rubefacients.

43. This disease was very prevalent in Holland, in 1809, particularly in the British troops composing the Walcheren expedition; and proceeded chiefly from endemic causes, and often either followed, or was converted into, intermittent or remittent fever (Davis, Dawson). It was frequently associated with disease of the liver and spleen; and presented the inflammatory, asthenic, and bilious forms. Bleeding, purgatives, calomel, and sudorifics were chiefly employed; but the disease was too generally injudiciously treated.

44. Dysentery became epidemic, in and around Vienna, in autumn, 1809, particularly in the French army; and assumed, according to circumstances, an inflammatory, bilious, adynamic, typhoid, or malignant form (Vignes). It often was infectious; and few of the medical officers escaped. Ipecacuanha, opium, emollients, clysters, sinapisms, and blisters; camphor, æther, arnica, serpentaria, cinchona, valerian, and aromatics, variously combined, appear to have been chiefly employed.

45. The more simple asthenic states of dysentery were prevalent in Flanders, in July, 1810 (Tonnelier); and, in the summer of 1811, in various parts of the north of France (Caron). In some villages, nearly all the inhabitants were attacked the same day. Ipecacuanha, gentle purgatives, rhubarb, calumba, simarouba, mucilaginous clysters, opiates with diaphoretics, warm baths, arnica, aromatics, Hoffmann's anodyne, &c., were generally employed. Favourable changes occurred between the tenth and fifteenth days. The disease sometimes passed into entiritis, and was occasionally followed by dropsy.

46. Dr. Pisani states, that dysentery of an asthenic kind, but presenting either inflammatory, malignant, or nervous symptoms, was so prevalent in the garrison of Mantua, in 1811 and 1812, that about 1000 cases were received into the hospital. It first appeared in some felons; from whom it extended to the soldiers in the wards, and by them was conveyed into the barracks. The medical attendants and assistants were attacked; but those who had no communication with the sick escaped. Small depletions, ipecacuanha, laxatives, emollients; with nitre, fomentations, mucilaginous clysters, neutral salts, rhubarb, Hoffmann's anodyne, camphor, and wine, according to the features of the disease, were most employed. Ventilations and fumigations were also resorted to.

47. In the expedition to New Orleans, dysentery, owing to cold, moist, and miasmatous air, wet clothing, and the use of foul brackish water, and fatigue, was the most fatal disease, assuming inflammatory, bilious, asthenic, and malignant forms. Bleeding, emollients, fomentations, opium, Dover's powder, and very large doses of calomel, appear to have been principally confided in. In fatal cases, the liver was frequently found diseased; and the colon very slightly ulcerated, but not sphacelated. — (*Edin. Med. Journ.* vol. xii. p 136.)

48. Dysentery, although it may not be said to have been epidemic in the strict sense of the word, was the most fatal disease in the British army during the Peninsular war. It was often connected with intermittents and remittents, and frequently supervened on these and other forms of fever (Sir J. M'Grigor); and attacked convalescents. It assumed inflammatory, bilious, typhoid, or malignant and chronic forms, according to the causes and concurrent circumstances. It was most prevalent and fatal at Ciudad Rodrigo, which was obliged to be made an hospital station for a time; and where, shortly before, "nearly 20,000 bodies were calculated to have been put into the earth, either in the town or under its walls, in a few months." It was unhealthy, independently of this circumstance. It was commonly treated by venesection, in the first stage; and by the warm bath, full doses of Dover's powder every hour, calomel and opium at night, sulphate of magnesia, in broth, in the morning: in the second stage, by demulcents, aromatics, opium, astringents, tonics, and flannel rollers.

49. This disease has been more or less prevalent in some part or other of Ireland, owing to the presence of endemic and even of epidemic causes. During 1817, 1818, and 1819, it was, conjointly with fever, epidemic throughout the island. The seasons were cold and wet; and, with this cause, famine, unwholesome food, and infection concurred. It was very often consequent upon the early stage of fever, or it appeared as a crisis of fever, or it occurred during convalescence. It was infectious in circumstances favouring this property; and presented inflammatory characters, but often associated with the asthenic diathesis. It was treated chiefly by moderate bleeding, ipecacuanha, the warm bath, opium in doses of four or five grains, calomel with opium, copaivi mixture, and farinaceous diet (Cheyne).

50. It was prevalent in several parts of Ireland, in 1722, at the same time with low fever, owing to scanty and bad food. It commenced with debility, pain about the umbilicus, mucous dejections, general cachexia, rapid and weak pulse, &c.; on which the pathognomonic symptoms supervened in an adynamic form. It was very fatal until wholesome and nutritious food was obtained (Dr. Graves, in *Trans. of Irish Col. of Phys.* vol. iv. p. 429.)

51. It was again prevalent in Dublin and the vicinity, in the autumn of 1825, after great heat and drought: affected first the better classes; sometimes appeared as fever for two or three days, and then passed into dysentery; or it occurred during convalescence from fever, and was infectious (Dr. O'Brien). It was of an asthenic and complicated form; the skin being of a dirty or dark hue, and harsh to the touch; and was very generally *treated* by bleeding, in robust persons, at an early stage; by the warm bath, and friction of the surface with camphorated oil; by calomel gr. x., and opium gr. ij., repeated in eight hours, and followed by purgatives, especially castor oil with a few drops of laudanum; by flannel rollers around the abdomen; and by Dover's powder, and the repetition of one or more of these means, according to circumstances.

white races; from insufficient and unwholesome food; and, *endemically*, from bad water, marsh effluvia, and animal and vegetable emanations floating in a moist atmosphere. It assumes some one of the asthenic forms, according to the causes which produce it, and the circumstances which influence it in its progress. Even when it appears sporadically, it is more liable to become infectious than in Europeans, owing to its passing more readily into a low, malignant, or putrid form, on occasions of imperfect ventilation or crowding of the sick. In such circumstances, it is sometimes quite pestilential in the rapidity of its dissemination and the extent of its fatality. In its sporadic states, it is frequently *associated* with rheumatism, or the one passes into the other; both generally arising from the same exciting causes — from cold and moisture. It is also very often *complicated* with worms, especially the round worm, in the *prima via;* these being passed with the stools in the advanced stage of the more severe and dangerous cases; and, in its less severe grades, it sometimes assumes intermittent or remittent types.

31. When dysentery attacks the dark races *sporadically,* and sometimes, when it seizes Europeans who have resided very long in a warm climate, it frequently commences with chills and much febrile reaction or irritation, the vascular excitement rapidly passing into an adynamic state — into great prostration of the vital and animal actions, and depression of spirits. The pulse is, at first, more or less quick and irritable — sometimes sharp and full; but it always becomes, in the space of one, two, or three days, small and soft. The rapidity of the change is seldom owing either to the loss of blood from the bowels, or to the quantity of matters evacuated, but rather to these conjoined with the exhaustion produced by the causes of the complaint, by the severity of the tormina, the want of sleep, and by the febrile irritation of the system, in less vigorous constitutions than those of the white race. In this class of patients, flatulence, nausea, sometimes porracious or bilious vomiting, quick small pulse, and occasionally scybalous evacuations, often containing worms, are very early observed; the surface of the body being shrunk, the superficial veins deprived of blood, and the extremities moistened by a colliquative sweat In these persons, however inflammatory the disease may be at its commencement, it soon exhausts vital power, and passes into the asthenic form; and, in seasoned Europeans, is sometimes contingent on, and *complicated* with, disease of the liver, or of the spleen, or even often of the absorbent glands; or is consequent on fevers, both periodic and continued, either in their course, or during convalescence from them.

32. III. Of the Type of Dysentery.—The inflammatory typhoid, and more malignant forms of the disease, are generally continued, or obscurely remittent. But the other forms may assume an obviously remittent, or even an intermittent type, owing rather to the concurrence of those causes to which periodicity in fever is owing, with those on which the dysenteric phenomena are more immediately dependent, than to the production of two distinct kinds of disease. We have seen, that dysentery often arises from endemic causes, very nearly similar to those which produce periodic fevers; the causes of the latter chiefly impressing the nervous system, those of the former vitiating the secreted and circulating fluids, and disordering the functions of the bowels. Therefore, when both kinds of causes concur, as they frequently do, in unhealthy situations and seasons, a form of disease is directly produced, in which many of the characters of both disorders are blended. In such cases, the ingestion of foul water, or of unwholesome food, and cold and moisture, contaminate the fluids, determine them to, and irritate, the *prima via;* whilst malaria, concurring with these causes, impresses the nervous system so as to impart a certain degree of periodicity to the morbid actions resulting from the combined agents. It also not unfrequently occurs, that, during the progress of agues and remittents, the secretions accumulated in, or poured into, the intestines will acquire such irritating or morbid properties as to superinduce dysentery, which will often for a while retain the periodic character; but, in most instances, a continued or obscurely remittent type will be the consequence of this change. A distinctly intermitting type is incompatible with either a considerable extent of inflammation, or much depravation of the circulating fluid; and one or other, or even both, of these changes, obtains in those forms of this disease which I have stated to be generally exempt from this character. It is frequently observed, that, when animal or infectious emanations enter largely into the causes of this disease, it assumes a continued and more or less of a malignant character. Numerous instances, illustrative of these views, came before me in warm climates; and the histories of the epidemic occurrences of the disease, when examined in their details, further confirm them. Sir J. M'Grigor, in his excellent review of the diseases of the army during the Peninsular war, states, that, in the hospitals in the Alemtejo and Estremadura, the type of dysentery was intermittent; that it became remittent in July, August, and September, when the army advanced rapidly, and remained some time stationary in the two Castiles; and that it was continued, typhoid, and very fatal, at Ciudad Rodrigo, where the sick were exposed to the effluvium extricated by 20,000 dead bodies. Here we see the disease pre-

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52. The disease was epidemic, in some parts of France, in the autumn and winter of 1825 (MM. Denoyer, Lemercier, and Bienvenu); and was, in several places, propagated by the exhalations from the sick and the evacuations; children, females, the weak, ill-fed, the aged, and those living near unhealthy and moist localities, being chiefly attacked. It assumed inflammatory, asthenic, and malignant forms; and, in several places, the small intestines and stomach were also affected. It was treated chiefly by local depletions, opium, repeated application of blisters, and demulcents. Tonics and antiseptics were required in the advanced stages and chronic states.

53. It again prevailed, in some parts of that kingdom, in October, 1827; and was, in several localities, attributed to the water, which abounded with decayed animal and vegetable matters, animalculæ, &c. (M. Compagny). It presented either inflammatory, mucous, asthenic, and malignant characters; and was treated by leeches, opiates, demulcents, and, afterwards, by camphor and cinchona.

54. The disease was epidemic in Glasgow, in the autumn of 1827, in a simply asthenic and mild form. Opiates, calomel and opium, ipecacuanha, demulcent enemata, blisters, warm baths, astringents, and bitter tonics were most serviceable. Bleeding, unless by leeches, was very seldom required, and was often injurious (Wilson, Brown, and Macfarlane).

55. Infectious dysentery, in adynamic or typhoid forms, has frequently appeared in ships, in prisons, and wherever many persons have been collected in ill-ventilated, and particularly in moist and miasmatous, situations. Instances of such occurrences are so numerous, have been so often noticed, and are so well known, that it is unnecessary to refer to them.

senting increased grades of severity as the causes augmented in intensity.

33. IV. Complications. — Having considered the forms of dysentery depending more directly upon the nature of the predisposing, exciting, and concurrent causes, I now proceed to notice those complications occasionally observed, especially in unhealthy seasons and localities. Many writers conceive that the asthenic varieties described above are complications of simple dysentery with different kinds of fever; and that, when they are infectious, it is not the dysentery but the fever which possesses this property. Some authors suppose that the typhoid variety especially is a complication of this description. But, if such be the case, wherefore should the disorder which is communicated be always dysentery and not fever? Moreover, this form of dysentery is often present where a case of typhus cannot be found. The fact is incontrovertible, that the asthenic forms, some of which are considered as complications by many writers, are direct, and necessary, and uniform results of certain diversified but concurrent causes; and not contingent associations of two diseases capable of separate existences, such as those about to be described: thus, cold and moisture will of themselves sometimes occasion simple inflammatory dysentery — as frequently occurs, where no other causes can be in operation; but when, with cold and moisture, there concur malaria, unwholesome food or water, or emanations contaminating the fluids, as is often the case, the disease assumes some one of the more severe and asthenic forms; the nervous and circulating functions having been thereby more seriously impressed. The local affection is occasioned, in these cases, by the nature of the ingesta, or by the morbid secretions consequent upon the action of the exciting causes, or by the retention of morbid or fæcal matters, or by two or all of these combined. (See § 70—72.) The complications of which more particular notice will be here taken are most commonly occasioned by the endemic causes of dysentery, and are those — (*a*) with diseases of the liver, spleen, and some other abdominal viscera; — (*b*) with jaundice; — (*c*) with scurvy, or scorbutic dysentery; — (*d*) with worms in the *primæ viæ*; — (*e*) with hæmorrhoids; — and (*f*) with rheumatism.

34. *A. Dysentery complicated with Disease of the Liver, Spleen, &c.* — *Hepatic Dysentery* of writers on intertropical diseases. — (*a*) I have already noticed an asthenic form in which the bile is excreted more or less in excess, or is otherwise disordered. In this form, which is frequently epidemic, there has generally taken place, for some time previously, an accumulation of this fluid in the biliary apparatus, without any actual disease of the liver; the discharge of much altered or acrid bile contributing, probably, with other morbid secretions and actions, to the production or perpetuation of the dysenteric symptoms. But, in the complication now about to be considered, the liver is generally inflamed, enlarged, or otherwise altered in structure, either previously to, coëtaneously with, or consecutively on, the dysenteric affection. Although this association of diseases of distinct but related organs is most frequent in the sub-acute and chronic states, it sometimes also occurs in any of the acute forms, as well in temperate as in warm climates; but oftener in the latter than in the former. It is also consequent upon agues, remittents, and continued fevers; and it is evidently often produced by endemic causes, especially in persons addicted to ardent spirits. When hepatic dysentery proceeds from these causes, the spleen is sometimes also diseased, as well as the pancreas, and mesenteric glands. Sir J. M'Grigor states, that, in the fatal cases of dysentery that occurred in the Peninsula, the spleen was as often diseased as the liver; and that both the pancreas and mesenteric glands were also frequently enlarged or otherwise changed. When acute dysentery is *complicated* with disease of the liver, this latter is frequently, likewise, of an acute or sub-acute character; and consists chiefly of inflammation of the substance of the organ; abscess and the chronic changes of this viscus being more commonly associated with sub-acute and chronic dysentery than with the acute.

35. *α. Acute hepatic Dysentery* generally commences with horripilations, chills or rigors, followed by pains in the forehead; bilious vomiting; bilious and variously coloured stools, voided with scalding at the anus, and urgent tenesmus. The discharges are often at first greenish, greenish black, or reddish brown and ochre-like; or watery, with a greenish frothy slime on the surface. A fixed pain, weight, or uneasiness, increased on pressure, is generally felt in the epigastrium, frequently extending to the right hypochondrium, right scapula, or top of the right shoulder; with a sense of pressure or tension in the right side of the thorax, anxiety at the præcordia, fits of dyspnœa, or a dry teasing cough, vertigo, and an accelerated and irritable pulse, particularly at night, when the patient becomes very restless, and the calls to stool more frequent and distressing. The tongue is at first white, the papillæ erect, or covered by a yellowish fur. At an advanced stage, it is clean, dry, smooth, red, or lobulated; or it is covered at the root with a dark crust. The skin is dry, harsh, of a dirty appearance, and hot; or it is covered by a greasy perspiration, copious sweats sometimes occurring in the last stage of the malady. There is great thirst, and desire of cold fluids. In other respects, the progress of the disease is similar to the more inflammatory form described above (§ 13.); but it often presents a greater range of symptoms in different cases, or at different stages of the same case.

36. *β*. In the above form of hepatic dysentery, the affections of the large bowels and liver seem to be nearly coëtaneous; but, more frequently, the hepatic disease follows dysentery, or does not appear until this latter begins to decline. In these cases, the patient is irritable, the cheeks present a hectic flush, and, upon examining the abdomen, the right *rectus abdominis* muscle resists pressure by an involuntary action. Little or no enlargement of the organ is at first felt; but either enlargement or tenderness becomes manifest, especially when blood has entirely disappeared from the stools, which are generally scanty, viscid, and dark. This form of the complication is evidently caused by the sudden cessation of the dysenteric affection; which, being very intimately dependent upon the excretion of morbid matters from the circulation and the economy in general, cannot be abruptly suppressed, without inducing continued or remittent fever, or inflammation, congestion, or enlargement of excreting organs. Both these mo-

difications of hepatic dysentery are often attended by much pain about the umbilicus, by irritability of stomach, and other indications of severe associated disease of the internal surface of the small intestines, and even of the stomach; particularly in warm climates, or in hot seasons when dysentery is epidemic, and in persons addicted to spirituous liquors. In some cases of hepatic dysentery, the liver is the only viscus, besides the large bowels, which is diseased; but, in many, the spleen, or the pancreas, and the mesenteric glands, are also affected.

37. (*b*) The *complication* with enlargement, thickening of the envelopes, or softening or other *disorders, of the spleen*, is of frequent occurrence where dysentery depends chiefly upon endemic causes, and when it is consequent upon agues or remittents. Thus, in places abounding with malaria, the *splenic association of dysentery* is much more frequent, especially among the natives of India, than the hepatic; the pancreas and lacteal glands being often also changed, and the disease assuming an intermittent or remittent type. Like the hepatic, the splenic affection may precede, may be coëtaneous with, or consequent upon, the bowel disease; but it is a more common result, particularly when the dysentery presents a periodic type, of the suppression of the discharges by means of astringents, before evacuants have been carried sufficiently far, or morbid matters evacuated. Thus I have seen dysentery consequent upon ague or remittents, when abruptly suppressed, to have been followed by a return of these forms of fever, and by enlargement of the spleen, in localities abounding with malaria; and nearly similar occurrences appear, from the comprehensive account furnished by Sir J. M'GRIGOR, to have been observed in the peninsular war. In this complication, the symptoms are but little different from the simple states of dysentery above described; but they more frequently assume a sub-acute and chronic, than an acute, form. In the cases that have come before me, the splenic affection could seldom be detected unless it consisted chiefly of enlargement, when a careful examination readily disclosed the state of disorder. In all endemic maladies, where we suspect disease of the spleen, the examination should be made with caution, as this organ may be most seriously injured by roughness. In some cases, as well, indeed, as in those in which the *pancreas* and *mesenteric glands* have been enlarged, the countenance and skin have presented a dirty or leaden hue, and the limbs have been much emaciated. But these complications are more common in chronic dysentery.

38. *B. Jaundice* is sometimes observed associated with dysentery, especially when the liver is diseased. But it may occur without any structural change of this viscus, owing to obstruction of the ducts, or to occlusion of the orifice of the common duct by inflammatory tumefaction of the mucous surface of the duodenum. It may possibly also arise from the absorption of morbid bile from the intestinal canal; or from the state of the soft solids themselves; these having acquired during disease the power of separating the colouring principles of the bile from the blood. (See DISEASE, § 108., and JAUNDICE.)

39. *C. With Scurvy, or Scorbutic Dysentery.* — This complication of dysentery was formerly much more frequent than at the present day; particularly in ships on long voyages, before lime juice was introduced as an antiscorbutic. When, however, the particular concurrence of causes whence it proceeds takes place, and is not counteracted by appropriate means, we must expect this form of the disease to prevail. Its destructive prevalence among the troops — British and native — employed in the Burmese war; and its occurrence in a modified form in the Penitentiary at Milbank; prove this position. On occasions of long navigation, and the transport of troops; in campaigns, sieges, or active military services, when there is a scarcity of fresh and wholesome provisions, with the usual causes of dysentery; this complication sometimes presents itself at the same time as the more malignant states of the disease; and in such circumstances, it is occasionally the prevailing and most destructive form.

40. *a.* The *Causes* which usually give rise to the disease are generally the concurrence, or subsequent operation, of those which produce dysentery, with such as occasion, or have already occasioned, scurvy, — especially living long on salted provisions, particularly pork, without a due supply of vegetables or farinaceous substances; innutritious, deficient, or unwholesome food, or the prolonged use of a fluid and greatly diluted diet; debility from previous disease; excessive fatigue; stagnant and foul water; concentrated marshy exhalations, or night-fogs in low situations and places bordering on the sea, or banks of rivers or lakes; confinement, or want of exercise in the open air and in the light of day, especially in miasmatous localities; nostalgia; anxiety of mind, disappointments, and depression of spirits; and, in some circumstances, particularly in the natives of warm climates, an insufficient supply of salt, or of warm spices and aromatics; or living on a poor, watery, and vegetable diet. Persons who have had dysentery, are very liable to this complication when subjected to the causes of scurvy. These causes lower the nervous and vital power, contaminate the circulating and secreted fluids, and ultimately deteriorate the vital properties of the soft solids; favouring serous or sanious exudations from the mucous surfaces, and those capillaries which derive the least support from the cohesion or density of the tissues they supply. Hence result the phenomena of this complication, when the weakened bowels are irritated by the morbid secretions poured into them from the collatitious viscera, and from their own glands and mucous surface; or by injurious ingesta.

41. *b. Symptoms.* — In this complication, very evident signs of scorbutic cachexia generally precede, for a longer or shorter time, the dysenteric symptoms, which, when they are developed, resemble the malignant variety above described (§ 27.), excepting that they are not attended by any febrile commotion; the antecedent contamination of the system being much more manifest than in the variety referred to, and symptoms indicating increased vascular action being usually absent: the countenance is pale, heavy, dark, dejected; in some cases sunk, in others slightly œdematous; the abdomen is drawn inwards, or sore upon pressure; the lower extremities are œdematous, with livid patches extending to the hams, frequently with ecchymoses, or petechiæ, or the breaking out of old ulcers, and with coldness of the sur-

face. The gums are spongy, dark, livid, tumid, and bleed upon the slightest pressure; the tongue is flabby, often raw, red, or reddish brown. The pulse is small, weak, and soft; and afterwards quick, feeble, and undulating. Sometimes, nearly coëtaneously with the above appearances, but more frequently after they have commenced and proceeded some length, diarrhœa occurs. The evacuations soon assume a serous or sanious appearance, with mucus, and grumous dark blood, mixed with feculent matters; and they are usually accompanied by griping and tenesmus, but in a much less degree than in the more simple forms of dysentery. Fæcal matters are seldom retained, the stools being free and sometimes copious. The biliary secretion is often more or less disordered; it being either copious or morbid—and then it increases the excoriation of the intestinal mucous surface; or diminished, or altogether obstructed. The urine is scanty, of a dark muddy appearance, or sanguineous; and a peculiar fœtor is often exhaled from both the alvine and cutaneous excretions. In the more severe cases, or towards the close, there is occasionally vomiting of a bilious, bloody, or dark and grumous fluid, with distressing flatulence, and pain or soreness in the hypochondria. The functions of the stomach are generally disturbed; and there is much disrelish of salted meat, or of the food on which the patient has been subsisting, with great desire for vegetable acids, vegetables, fruits, warm spices, fresh meat, milk, &c. In the progress of the more dangerous cases, copious effusions of fluid dark blood, with detached portions of the mucous surface, are seen in the dejections; with coldness and lividity of the surface, leipothymia, and sometimes with paralysis of the *sphincter ani*, and excoriations about the anus. Discolouration of the surface, breaking out of old sores, falling out of the teeth, great loss of flesh and prostration of strength, and extreme despondency, further characterise the advanced stage.

42. *D. Dysentery is so frequently complicated with Worms in the prima via*, that many writers consider them to predispose to it; and with much probability. The large round worm is the species most frequently observed; but others are occasionally seen. The excretion of worms has been viewed by many as an unfavourable symptom; and I believe that it often is so, as it indicates a grave affection of the system, or the extension of disease to the small intestines. When dysentery is prevalent among the inhabitants of unhealthy localities, or the natives of hot climates, this complication is observed in a large proportion, sometimes in more than one half, of those attacked; and, in the latter class of subjects especially, it is characterised by more or less asthenia, and assumes some one of the forms arranged under this head, according to the nature of the exciting and concurrent causes.

43. *E. The disease may also oocur in a person liable to, or affected by, Hæmorrhoids*; especially in those of a plethoric or sanguine constitution, or who are subject to vascular determination to the prostate gland and rectum, from too frequent sexual congress. In such cases, the tenesmus is often the chief symptom; and, in consequence of the tumefaction of the vessels, and coats of the rectum, a complete retention of fæcal matters and constant straining are present. The disorder is commonly local, chiefly simple, and inflammatory, and often subsides upon a copious discharge of blood from the internal hæmorrhoidal vessels, which takes place after longer or shorter suffering, and frequently oftener than once. In some cases, *prolapsus ani* occurs, and aggravates the symptoms. In other respects, this complication differs but little from the mild or inflammatory forms (§ 12.) described above.

44. *F. The association of Rheumatic Symptoms with Dysentery* has been so frequently observed, that many authors (§ 74. *e.*) have contended for the rheumatic nature of the disease. The connection of rheumatism with dysentery occurs in one or other of the following ways:—1. Rheumatism may be prevalent either before, or at the same time as, or subsequently to, dysentery:—2. It may also precede, accompany, or follow, the bowel disease in the same person. In all these forms the connection has been observed by authors, and in some of them by myself,—but chiefly in the slighter or more inflammatory forms, which are most frequently occasioned by the same causes as those which produce rheumatism, viz. cold and moisture, or vicissitudes of temperature, with terrestrial emanations: dysentery attacking those who are predisposed to it by the accumulation and stagnation of morbid secretions or acrid fæcal matters in the digestive viscera, &c.; and rheumatism, those who possess the rheumatic diathesis, or in whom the morbid secretions are not set loose, or the balance of circulation and exhalation is not thrown in upon the intestinal canal. Conformably with this view, it will be evident that both affections may occasionally coexist, and that either may supervene upon the disappearance of the other, especially when the above causes continue in operation.

45. V. SUB-ACUTE AND CHRONIC DYSENTERY, AND CHRONIC DIARRHŒA.—i. Dysentery may occur primarily in the mild and *sub-acute* form described above (§.12.); and yet, in consequence of neglect, or of the continued exposure of the patient to its endemic or other causes, it may run on to a very chronic duration, or assume the form of chronic diarrhœa or lientery. It may lapse into either of these forms from the acute, in a gradual manner; or either of them may commence as diarrhœa; the characters of sub-acute or *chronic* dysentery appearing gradually, or more or less suddenly, in their progress. When the disease arises chiefly from malaria or other endemic causes; or follows agues, remittents, and diseases of the liver or spleen; it more generally assumes a sub-acute and chronic form, or passes into chronic diarrhœa, than in other circumstances. In other respects, the *causes* of the chronic states of dysentery, even when occurring primarily, are the same as those that produce the acute forms. These states, however, are oftener met with in those who have had disorders of the stomach, liver, or bowels, in long residents in warm climates or unhealthy localities, and in the natives of such places, than in others; and they are more frequently complicated with diseases of the liver, spleen, omentum, pancreas, &c. in persons thus circumstanced. In most cases, these states of the disease differ from the acute, chiefly in the greater mildness of the symptoms, in the absence of a few of the more violent phenomena, and in the much more uncontrollable and persistent nature of such as are present. Besides following upon, or being rather prolongations

of, the acute, they may be the sequelæ of any of the forms of diarrhœa, of common or pestilential cholera, and of fevers that have been neglected in their early stages, or improperly treated. When it occurs primarily, which is comparatively rare, it may, after a considerable time, assume the acute characters.

46. *a.* The *Symptoms* of chronic dysentery differ chiefly in degree from those characterising the more simple inflammatory form of the acute disease (§ 12, 13.). The fever of the latter generally subsides, especially during the day; and the appetite and strength frequently return for a time. Tormina and tenesmus either altogether disappear, or are present in a slight degree; but sharp griping pains, and soreness in the abdomen, are often complained of. The stools are more or less serous, mucous, muco-puriform, or gelatinous; contain some fluid feculent matter, or ill-digested substances; and vary from a white albuminous, or white of egg, appearance, to a dark olive green or greenish black; being sometimes marbled; or one day like chalk and water, and on another like a dark jelly, or the green fat of a turtle. Blood is often either so intimately mixed with the evacuation as to give it an uniform brick-red colour, or is quite distinct and fluid, or partially coagulated. The puriform or muco-puriform matter generally exists as small streaks; but this matter may not be detected, although ulceration of the large bowels is present. The discharges are more copious than in acute dysentery, but much less frequent; being commonly from three or four to ten or twelve in the twenty-four hours. The pulse is not accelerated in the early part of the day, but it usually becomes quicker towards evening; and is feeble, unequal, sometimes slow, or intermitting. The tongue is often dark red or glossy; the countenance sunk and anxious; the surface cold, lurid, dirty, harsh, dry, or even scaly; the body emaciated; and the abdomen hard, tumid, not very painful on pressure, excepting about the cæcum or sigmoid flexure of the colon, with griping pains in the course of the colon. In the more advanced stages of the disease, the feet and legs become œdematous; the lips and surface exsanguineous; the surface and the evacuations exhale a peculiar, offensive, and subacid odour; sometimes jaundice or ascites supervenes, and the patient at last sinks under the irritation and hectic symptoms, after many weeks or even months of continued or remittent suffering.

47. *β.* Chronic dysentery sometimes assumes a modified character, which is essentially the same as the ulcerated and lienteric forms of Diarrhœa (§ 11, 12.). In these cases, the mucous follicles and coat of the small, as well as of the large, intestines are affected; but in warm climates and unhealthy situations, disease extends much further, and generally comprises lesions either of the liver, spleen, pancreas, mesenteric glands, or of two or more of these. Repeated attacks of dysentery, in these places, frequently terminate in chronic dysenteric diarrhœa in a simple or complicated state; and I have seen cases where it has continued for years, with slight remissions; the stools being lienteric, copious, and crude, and the appetite ravenous. In some cases of this protracted state of disease, especially where the stools are gleety or mucous, and voided with tenesmus, but without tormina, the rectum only is affected; one or more ulcers being seated at a greater or less distance from the anus. The sub-acute and chronic forms are not infrequent in *children*, are in them often accompanied by *procidentia ani*, and are generally inflammatory, particularly when occurring sporadically. *Chronic dysentery* in the *dark races* assumes the appearance of a gleety discharge from the bowels, and depends upon deficient tone of the vessels and follicles of the intestinal mucous surface, rather than upon inflammatory action.

48. ii. *Complications of Chronic Dysentery* are most frequent in countries within the tropics, and in places abounding with terrestrial emanations. — (*a*) When chronic dysentery is complicated *with disease of the liver*, the symptoms often approach those of diarrhœa; and the hepatic affection is generally latent, insidious, and also chronic; the internal structure of the organ being chiefly implicated. In this state of disease, the evacuations are frequent; attended by griping pains about the umbilicus; and are of a dark green colour, indicating a morbid state of the bile; or of a pale clay colour, showing torpor of the liver or obstruction of the ducts. In some cases, they are dirty, watery, and offensive; and in others, of a whitish appearance: whence has arisen the term "*white flux*." These last seem like chalk or lime mixed in a dirty fluid, or intermediate between this and whites of eggs; occasionally they resemble cream or yeast; and they are often slimy, and contain broken down, clay-coloured fæces, and half-digested substances. These sometimes continue for a long time; or they change to a darker colour, apparently from a partial discharge of bile or the medicines taken; and afterwards return to their former hue. This state of the dejections is evidently owing to the obstruction of bile, to the consequent impairment of chylifaction, and to the increased and morbid secretion of the follicular glands and mucous surface. In addition to these, the patient complains of tightness, fulness, or oppression at the epigastrium and lower part of the thorax, particularly on the right side; and of slight evening exacerbations of fever. The eyes have frequently a pearly appearance; and the countenance is livid or sallow. This complication is often *caused* by the excessive use of spirituous and other intoxicating liquors; and by the concurrence of the causes of hepatitis with those of dysentery; and it frequently is *consequent* upon hepatitis; upon intermittent, remittent, or continued fevers; and upon the acute disease, when it arises from endemic causes. The dysenteric symptoms are manifestly occasioned or perpetuated either by a morbid condition, or by deficiency, or total obstruction, of bile: this secretion being indispensable to the due performance of the assimilating processes, and to the healthy state of the mucous surfaces and follicles. In other cases of this complication, the enlargement of the liver, or the symptoms of hepatic disease, are less equivocal, and approach more nearly those stated above (§ 35.). (See, also, Liver — *Abscess in.*)

49. (*b*) — *a.* When chronic dysentery follows the diseases just now mentioned, or the prolonged or intense operation of endemic causes, it may become associated with *scorbutic* symptoms; or

dysentery, in a sub-acute or chronic form, may be consequent upon scurvy, as in the scorbutic complication already described (§ 39.). The chronic states of the disease may also associate with them changes of other viscera beside those of the liver. In the hepatic complication, especially in hot countries, the internal surface of the *small intestines* is very frequently also inflamed or ulcerated, and the *spleen, pancreas, mesenteric glands*, or *omentum*, may be affected in addition. When chronic dysentery follows periodic fevers, the spleen and mesenteric glands seldom are altogether sound. I have never witnessed an inspection of a case, either in temperate or in warm climates, that did not present lesions in one or more of these organs, beside those in the bowels; but some of these were manifestly consequences of the disease, and not associated with its early stages. With the exception of the complications with disease of the liver and spleen, the exact pathological state can seldom be ascertained during life. When the patient is very much emaciated, enlargement of the pancreas or of the mesenteric glands may be suspected, from hardness and fulness in the abdomen — usually between the pit of the stomach and umbilicus; and from aching pains in the back. — β. In the *dark races*, the complication of chronic dysentery or diarrhœa with disease of the liver is very rare; but those with enlargement of the *spleen* and of the *mesenteric glands*, with *worms*, and with *rheumatism*, — especially the last two, — are very common. — γ. In *children*, the association of the complaint with enlargement of the mesenteric glands, or with worms, is not infrequent; and the complication of the slighter or sub-acute states with *bronchitis* is sometimes also met with among them.

50. VI. TERMINATIONS AND PROGNOSIS. — i. *The Acute varieties* of the disease may terminate — 1st, in a return to health; — 2d, in periodic or continued fever, or some visceral disease; — 3d, in ulceration, and the extension of inflammatory action to the peritoneum, or perforation of the bowels; — 4th, in sloughing of the internal tunics, and gangrene of portions of the intestinal tissues; — and, 5th, after having assumed a *chronic form*, in constriction of the colon, and other organic lesions; or in gradual exhaustion of the powers of the constitution. — (*a*) A *favourable issue* may be expected, if the stools become less frequent, more copious and feculent, and the biliary secretion more natural; if the tormina and tenesmus abate, and the patient be less disturbed in the night; if the abdomen be less painful, especially on pressure; and if tumefaction or tension be not present; if the febrile phenomena be alleviated, the pulse, tongue, and skin becoming more natural, between the sixth and seventeenth days in the asthenic forms; and if the symptoms indicating the other terminations be not observed.

51. (*b*) When the disease is suddenly arrested by astringents, or otherwise injudiciously treated, particularly when it arises from endemic and epidemic causes, it may pass into ague, remittent or continued fever; or into inflammation and abscess of the liver, or into peritonitis or enteritis. These results evidently arise from the stoppage of the discharge of morbid matters that require elimination from the system, and the consequent irritation these matters produce upon the nervous and circulating systems, or upon the organs chiefly concerned in excreting them. But, on some occasions, these maladies may supervene, without any aid from the practitioner. When dysentery occurs in the *puerperal state*, particularly soon after delivery (and, when the disease is epidemic, females thus circumstanced are very liable to it), it is very apt to pass into peritonitis; or to be followed by effusion into the peritoneum, and even by inflammation of the womb. In 1832, I treated a case of sporadic dysentery in a lady who had not been pregnant for several years. It was followed by hysteritis; which, in its turn, was followed by phlegmasia dolens, first in one thigh, and then in the other. She is now in good health. In some instances, particularly in hot climates and in young children, introsusception of portions of the intestines may take place, and give rise to grumous or feculent vomitings, and all the symptoms of ileus. I have sometimes seen children seized, during dysenteric complaints, with convulsions, obstinate vomiting, distressing colicky pains in the abdomen, and stupor, followed by various sympathetic phenomena, and death; and, upon dissection, the only lesion, besides signs of irritation in the digestive mucous surface, has been invagination of more or less of the intestinal tube, and the usual consequences of this occurrence. In a case of this kind, which was supposed to have died of acute hydrocephalus by the medical attendant, and which was opened by Mr. ALCOCK in my presence, the greater part of the ilium had passed into the cæcum; and the cæcum, with its contents, into the transverse arch of the colon.

52. (*c*) If a favourable change take not place, in the more sthenic varieties, before the twenty-fourth day; and in the asthenic states, previously to the eighteenth or nineteenth days; or if only a partial change be observed; the disease usually either passes into the *chronic form*, or assumes still more severe characters.

53. (*d*) *An unfavourable termination* may be looked for, if the foregoing symptoms (§ 50.) be aggravated; or if no impression have been made upon the complaint, about the time stated above; or between the ninth and fourteenth days in the severe asthenic forms; if the abdomen become enlarged, tense, or tender, or preternaturally hot, especially about the umbilicus; or if pain increase rapidly, and be constant and fixed in one part; if the watery discharges, loss of blood, or the harassing frequency of the calls to stool, particularly at night, sink the powers of life, or be attended by cramps in the lower extremities, leipothymia, or syncope; if the face be anxious, or Hippocratic, and the body emaciated; if stupor, delirium, picking of the bed-clothes, startings of the tendons, supervene; if the extremities or surface be discoloured, or the former be cold or clammy, or the latter of a lurid hue, or exhale a cadaverous or an offensive odour; if drinking be followed by tormina and a desire to go to stool; if the tongue be raw, glossy, or very dry, and dark red; or dark sordes collect about the teeth, or aphthæ appear in the mouth or on the lips; if the pulse be very weak, irregular, or intermittent, or rise in frequency to upwards of 120; if respiration be rapid, laboured, or difficult; if the breath be fœtid and cold; if the matters vomited be offensive or grumous; if ecchymoses or sphacelating ulcers appear on the surface; if sight or hearing be partially lost; if paralysis of

the *sphincter ani* take place, and the stools be involuntary, or grumous, or like washings of meat, cadaverous, or mixed with small black coagula, or with light muco-puriform streaks, and especially if they contain sphacelated portions of the mucous coat; if the stomach be so irritable as to reject whatever is taken; and if complete strangury or suppression of urine take place. Hiccup is not an unfavourable symptom, if it occur early in the disease; but when it comes on at an advanced stage, it is often an indication of the extension of the disease to the peritoneum, or of the sphacelation of the mucous membrane.

54. *α*. *Ulceration* may take place early, even in the mildest forms of the disease, without causing any decided change. Most frequently, however, it is attended by aggravation of the symptoms; the stools passing from a mucous to a serous, sero-puriform, or grumous state. At its commencement, especially in the less inflammatory cases, little fixed or constant pain is felt; but as it advances through the coats, pain, in some form, is experienced. At an advanced period, especially when sphacelating ulcers exist, the stools become dark brown, muddy, or watery, and smell like washings of meat. The blood discharged is often of a darker colour, and sometimes mixed either with an ichorous sanies, or, in the more sub-acute or chronic cases, with purulent streaks. When the blood is in large quantity, and unmixed with the rest of the dejection, ulceration low in the canal may be inferred.

55. *β*. *Extension* of inflammatory action to the *peritoneum*, or the *omentum*, or to the *mesentery*, is generally owing to ulceration, and may occur either previously, or subsequently, to *perforation* of the intestinal parietes. If great increase of pain, with heat, fulness, and tension of the abdomen, distressing anxiety, restlessness, inability to sleep, frequent retchings, and copious discharges, *per anum*, of morbid secretions and fæcal matters which had been retained while the spasmodic action of the bowel was in full force, supervene at an advanced stage, extension of inflammation to the peritoneal coverings may be inferred; and, if these symptoms take place suddenly, and are quickly followed by very painful meteorismus, hiccup, cold sweats, sunk countenance, jactitation or delirium, rapid and laborious breathing, a very wiry or small, irregular, and weak pulse, cold extremities, &c., they may be imputed to perforation of the bowel. Inflammation may also extend, generally with ulceration of the tunics, from the cæcum to the *appendix vermiformis*, and thence to the peritoneum; or to the external connecting cellular tissue, giving rise to abscesses in the right iliac fossa, that may open either into the cæcum, or externally. (See CÆCUM, § 19. 21.) A case of this description was treated by me in a warm climate, in 1817. It had been neglected in its early stages, and a very large abscess had formed and burst into the cæcum; extensive ulceration and sphacelation of this part being found on dissection.

56. *γ*. *Gangrene* seldom proceeds, even in the most severe cases, further than the mucous and submucous tissues; excepting in warm climates, where sloughing ulcers, sometimes of large size, penetrate all or most of the coats. This change is commonly occasioned by the extension of the inflammatory action to the tissues underneath, and the consequent detachment and death of the portion of this coat covering the parts particularly affected; as the cuticle is detached by the effusion of fluid underneath it, when the vascular tissue of the skin is acutely inflamed. In such cases, portions of the partially sphacelated membrane hang loose in the canal, whilst the more external tunics are altered in colour, and softened. The *symptoms* indicating the commencement of sphacelation of portions of the mucous coat, are those detailed in the preceding paragraph, followed by leipothymia, or syncope when the patient is raised; a sudden remission of the tormina, abdominal pain or heat; singultus; cold, shrunk, and bedewed countenance and extremities; sense of cold in the abdomen; involuntary motions; lividity of the lips and cheeks; partial convulsive movements; extreme prostration, and the supine posture; glassy, inexpressive state of the eyes; cadaverous or very fœtid smell from the evacuations, and the body; and, lastly, insensibility.

57. ii. *The Chronic forms*, besides terminating in ulceration and extension of inflammatory action to the serous surfaces, often superinduce thickening of the coats, and stricture, in some part of the colon or rectum, or of both, frequently with dilatation of the portion above the contraction; ultimately terminating, in some instances, in rupture of the more dilated and attenuated or ulcerated part, and effusion of the intestinal contents into the peritoneal cavity. In some cases, ascites comes on, or œdema of the lower extremities, or both, and the patient sinks in an exhausted and dropsical state.

58. VII. APPEARANCES ON DISSECTION vary with the form of the disease. In the inflammatory varieties, they are limited to the large bowels, and parts immediately connected with them; but in the asthenic and complicated states, especially in the scorbutic, the changes are much more extensive. —*a*. Upon opening the abdomen, the *omentum* is sometimes adherent to the superficial convolutions of intestines, or to the brim of the pelvis, or to some part of the abdominal parietes; but it is oftener drawn up to the arch of the colon, or to one side. The *bowels*, externally, present merely changes of capacity and colour, unless partial or general peritonitis have supervened. They are commonly distended by flatus, and variously coloured in different cases or parts, and frequently without the external colour having reference to the state of internal change. The large bowels feel in one place thick and doughy, in another thin and membranous. The colon is sometimes displaced or elongated, from relaxation of the longitudinal bundles of fibres; the transverse arch hanging down in a loop, or the sigmoid flexure passing over to the right side (ANNESLEY, &c.). Contractions of a considerable part of the colon are frequent, and sometimes the constrictions resemble those made by a ligature,—the parts above being distended and thinned; they are firm and almost cartilaginous in some chronic cases, and seated chiefly about the sigmoid flexure and arch of the colon, and more rarely in the rectum. Adhesions of the peritoneal surface of the colon to the adjoining parts, and effusions of lymph, or of serum, into the peritoneal cavity, also, are often seen.

59. *b*. Internally, the bowels present extensive and numerous changes. The villous coat is differently shaded in different parts; and varies

from a pale grey or sea green to a bottle green or violet colour; or from a pale pink to a bright red, or reddish brown, shaded with black. In some, the most opposite colours pass abruptly into one another. Large portions of coagulable lymph are sometimes found partially adherent on this surface. *Excoriations* of the mucous epithelium, the excoriated parts presenting a chocolate tint; detachment of portions of the villous coat, sinuosities existing underneath the parts intervening; *softening* of the internal tunics; *ulcerations*, in all the forms described in the article DIGESTIVE CANAL (§ 36—40.); and *sphacelation* of portions of the mucous and submucous tissues; are the most frequent appearances, and are met with, in various grades, in all the forms of the disease. The *ulcers* are either small, numerous, and clustered, or large, distinct, and few. They are often dark, extensive, and sloughy; the parts in which they are seated, as well as those surrounding them, being softened, or very easily torn, particularly in the asthenic varieties, and in the scorbutic complication. They are frequently elevated on a thickened or hardened base, in the more chronic cases, as described in § 36. *e.* of the article now referred to; or they present exuberant fungous or fleshy granulations on their surfaces. In some instances, their centres are very dark or blackish (PRINGLE, MONRO, &c.). Deficient vital cohesion of the coats of the bowels, they being occasionally torn as easily as wetted paper, is very common in the more asthenic varieties. In prolonged inflammatory cases, thickening and almost cartilaginous induration of a considerable part of the colon are not infrequent, the thickened or indurated portion being also contracted in calibre. In such cases, the parts above the contractions are greatly distended, the coats being thinned, ulcerated, and even lacerated; the contents of the bowel having passed into the peritoneal cavity, and occasioned rapidly fatal peritonitis. The *cæcum* is extensively disorganised; and the parts surrounding it are, in some cases, inflamed, or in a state of suppuration, or sphacelation (ANNESLEY and myself). The *appendix vermiformis* is also occasionally inflamed and ulcerated. The *small intestines* are very often inflamed, especially in the internal surface; and ulcerated in their lowest third, particularly in the asthenic varieties, and in the hepatic and scorbutic complications. In some instances, the ileo-cæcal valve having been ulcerated, extensive intus-susception of the ilium takes place into the cæcum and colon. Invaginations occur also in other portions of the intestinal tube, especially the ilium. (See DIGESTIVE CANAL, § 18—48.)

60. *c.* The *collatitious viscera* are generally diseased in the asthenic and complicated states. The *mesentery* and *mesocolon* are more vascular than usual; and the *glands* of the former are inflamed or enlarged, more rarely suppurated, especially in situations corresponding to large ulcers. A dirty-coloured fluid is occasionally affused in the peritoneal cavity in malignant or typhoid cases; and sometimes, also, in the thoracic cavities. The *spleen* is either enlarged or softened in the asthenic varieties, or when the disease is consequent upon periodic fever; and the *liver* is congested, inflamed, suppurated, or otherwise disorganised, in the hepatic and scorbutic complications. Congestion of the portal vessels is very common in both the asthenic and sthenic forms. Injection and changes of colour of the internal surface of the *stomach* and *duodenum*, and accumulations of viscid thick bile in the *gall-bladder*, are frequently observed. The *pancreas* is sometimes enlarged, and presses upon the common duct. The *urinary bladder* is occasionally inflamed about its neck, or in its external tunics; and the *prostate* somewhat enlarged. In the dysentery recently epidemic in Ireland, Dr. O'BRIEN found the liver diseased in one half the dissections; the spleen in one fourth; the small intestines in two thirds; and the colon and rectum in all. In chronic cases, in the British army in the Peninsula, the spleen, liver, pancreas, mesenteric glands, &c., or any two or all of these, were more or less diseased (Sir J. M'GRIGOR, DR. FERGUSON, DR. SOMERS, DR. FORBES, &c.).

61. *d.* In the most *malignant varieties*, and in the *scorbutic complication*, the internal surface of the whole digestive tube is of a livid, purple, or dark colour; with patches of ecchymoses, excoriation, ulceration, and sphacelation. The villous coat, particularly in the seat of ecchymoses, may readily be rubbed off; and the ulcers have a foul and dark appearance. The liver is sometimes large, soft, and spongy; at others, pale and soft, especially in cases where the loss of blood has been very large. The spleen is sometimes so softened as to appear semifluid or sphacelated. The heart is often partially softened or flaccid; the pericardium and pleural cavities containing a bloody, dark, and dirty serum. The lungs are often congested; the bronchial lining dark, or ecchymosed; and the blood in all the large vessels is semifluid, black, and of a very loose texture. Indeed, the vital cohesion of all the tissues is, in these forms of the disease especially, more or less lost. In the *dark races*, the digestive mucous surface is usually paler and softer than natural, or discoloured or sphacelated; the follicles enlarged or ulcerated; the coats of the cæcum and colon very easily torn; the liver pale, soft, and small; the spleen enlarged and softened; the pancreas occasionally enlarged, and the mesenteric glands always enlarged, or otherwise diseased.

62. VIII. DIAGNOSIS. — Dysentery often very nearly approaches either *fever*, *diarrhœa*, *cholera*, or *colic;* and it frequently supervenes upon one or other of these diseases; fever, diarrhœa, &c. almost insensibly passing into it. — (*a*) *Fever*, especially some of its endemic and epidemic forms, sometimes assumes an enteric character, closely resembling the asthenic states of dysentery, particularly as respects both the frequency and character of the evacuations; a circumstance which led SYDENHAM, BLANE, JACKSON, and others, to consider the latter as fever turned in upon the bowels. Although, in some cases, the one may insensibly pass into the other, yet idiopathic fever, with predominant enteric affection, will be distinguished from dysentery by the more marked constitutional affection before the bowels become disordered, by the much less pain and difficulty in the excretion of urine, by the absence of severe tormina and straining, and by a more feculent state of the evacuations, than in any of the forms of the latter disease. It has been supposed by many writers, that the more asthenic or malignant states are mere associations of dysentery with adynamic or typhoid fever: but, instead of

viewing these states as complications of two diseases distinct from each other in their nature and seat, it would be more philosophic to consider them as coexistent results of the operation of certain concurring causes upon the economy; which causes, according to their natures, and the predisposition and habits of the affected, induce effects partaking more or less of the characters of either fever or dysentery. In most instances, where the disease seems to have been thus mixed, animal emanations, a close and impure air, or other depressing and contaminating agents, acting either internally or externally, and aided by epidemic influence, have manifestly existed. But it is rather to the presence of those agents, in such a form as to act upon the excreting viscera and prima via, or in such combinations as to determine their effects to this quarter, assisted by antecedent disorder or predisposition of the digestive and excreting viscera, that the adynamic states of dysentery are to be imputed. Thus an impure or infected air — either short of inducing, or even sufficient to induce, the worst forms of fever — may produce a malignant or typhoid state of dysentery, when aided by unwholesome water or diet; and this latter cause, unassisted by the former, may also occasion the same disease, in a similar or a less severe form, in those greatly predisposed. Hence, according to the nature and concurrence of causes, will effects upon the frame be induced; which will insensibly approach fever on the one hand, and the most simple and perfect dysentery on the other.

63. This *modification* of the disease, with the nature of the disposing and exciting causes, is further illustrated by the intermitting and rheumatic characters occasionally assumed by it, in both its endemic and its epidemic states of prevalence. In localities where marsh miasmata abound, and where the water or the food are unwholesome, or other causes of dysentery prevail, this disease often either assumes, in both its acute and chronic forms, in warm climates especially, an intermittent or remittent type — most frequently the latter — or supervenes upon or passes into these, or into continued fever. Of this I have seen numerous instances; and similar facts have been recorded by nearly all the writers on the diseases prevalent in the armies engaged in the last wars. In certain of its epidemics, especially those which prevail in cold and moist seasons, dysentery sometimes follows, or is otherwise connected with, catarrhal affections, as observed in those recorded by STRÖM, G. BAKER, and NEUMANN; and it occasionally is complicated with rheumatism, particularly in one or more of the joints or extremities, the amelioration of the one affection being often followed by aggravation of the other. The association of dysentery and rheumatism, and their conversion one into the other, are stated by Dr. SIMS to have been remarkable, in the epidemic in London, during 1769 and 1770. A somewhat earlier and a more distinguished writer,—Dr. AKENSIDE,—likewise alludes to this subject, in a manner worthy of the most philosophic of our poets, and observes: — "Novimus præterea, eadem tempestate et ob easdem causas rheumatismum quoque frequentissimum fieri;" whilst he states, in another place, that, although these diseases prevailed separately, they were, owing to the similarity of their causes, often coexistent, or consequent the one on the other: a circumstance not confined to this climate, and occasionally observed in certain seasons, but also remarked amongst the natives of intertropical regions.

64. (*b*) *Diarrhœa* is so very closely allied to dysentery, that they may be viewed as varieties or grades of the same morbid actions. Nosologists, in their rage for drawing distinctions, which exist only in extreme cases, have wittingly overlooked the fact, that, between both diseases, there often scarcely exists a shade of difference; whilst, between the extremes, the distinction is sufficiently wide, and easily made. Dysentery frequently follows simple diarrhœa, or diarrhœa attended by fever; and is itself also followed by diarrhœa, in some one or other of the forms in which it is described; and both diseases may be merely the sensible phenomena either of the irruption and excretion of morbid secretions, or of inflammatory irritation, affecting somewhat different portions of the alimentary canal. Yet, although thus very closely allied in nature and form, they are very often distinct, as respects — 1st, the seat of disease; 2d, the affection of the system generally; and, 3d, the symptoms resulting from each. — α. *Diarrhœa* is generally sporadic, and never infectious;—β. It occurs at any season, and is more commonly a chronic disease than dysentery; — γ. It is usually neither preceded nor attended by fever; — δ. It is unaccompanied by severe tormina and straining; — ε. In it, the evacuations are more or less abundant, and not bloody; — ζ. It is seldom attended by vomiting or heat of skin, or by early depression of the powers of life, as observed in dysentery; — η. The history of the disorder, particularly in relation to its causes and constitutional disturbance, will point out many points of dissimilarity between it and dysentery.

65. (*c*) *Cholera* differs from dysentery, — α. In appearing only during the latter part of summer, and in autumn; — β. It is a most acute disease, running its course in from one to two or three days; — γ. It is unattended by straining, or blood in the stools; — δ. In it, the stools are abundant, very frequent, and the vomiting almost constant; — ε. Spasms of the legs and abdominal muscles, characterising cholera, are seldom met with in dysentery, excepting towards an unfavourable termination of the super-acute cases. It should not, however, be overlooked, that cholera sometimes runs into dysentery, evidently owing to the irritation excited in the large bowels by the morbid secretions poured into the digestive canal.

66. (*d*) Dysentery can hardly be confounded with *colic*, if due attention be paid to the history of the case. — *Colic from lead*, *bilious colic*, and *ileus* from hardened substances in the bowels, or from invagination, sometimes present features of resemblance to dysentery; particularly the violent pains in the abdomen, vomiting, and occasionally abortive efforts at evacuation, with very scanty watery or bloody discharges. But, in these, there is neither antecedent diarrhœa, nor attendant fever, nor frequent calls to stool, nor tenesmus, nor any considerable evacuation in the aggregate, nor fixed pain in the hypogastrium, nor scanty, difficult, and painful excretion of urine, or *tenesmus vesicalis*, — all which characterise dysentery. In these, also, vomiting is much more urgent, sometimes becoming feculent, and the paroxysms of

pain more violent, particularly around the umbilicus, than in this disease; the matters received into the stomach being ejected from it without exciting either a desire for stool, or tenesmus. It should, however, be kept in recollection, that the bilious or endemic colic of warm climates (see COLIC, § 16.) in some cases differs but little from dysentery, and that chiefly as respects the more complete retention of the morbid secretions and excretions, as will be seen from the history of both diseases.

67. (*e*) *Internal hæmorrhoids* sometimes give rise to symptoms resembling dysentery, — or rather to tenesmus, an affection entirely of the rectum, the seat of these internal tumours. The tenesmus of hæmorrhoids, whether attended by discharges of blood or not, is strictly a local complaint, is seldom severe or preceded by tormina, or frequent calls to stool, or much constitutional disorder; and is a simple obstruction to the passage of consistent stools, which are not mucous, and not streaked with blood, which, if passed at all at stool, is entirely distinct from the fæcal evacuation; the hæmorrhoidal tumours often protruding at the time. These, independently of the different circumstances under which both diseases occur, and the history of their progress, are sufficient to distinguish them from one another.

68. IX. PATHOLOGICAL INFERENCES. — i. THE MODES OF OPERATION OF THE CAUSES. — There is, perhaps, no other disease which requires a more accurate analysis of its pathological conditions, with strict reference to their causes, than dysentery; for these causes induce so very different states of morbid action in connection with that which especially constitutes the malady, that the practitioner will often attempt in vain either to limit its spread, in circumstances requiring this precaution, or to arrest its progress in particular cases, without being acquainted with the operation of its diversified causes upon the system, and the nature of the effects they induce.

69. 1st. *Operation of causes which dispose to the disease* (§ 9. 22.). — These, when their nature is known, and their mode of operation ascertained, may be sometimes averted, and an attack thereby prevented, especially when the malady is prevalent. — (*a*) High ranges of temperature, and consequently hot seasons (PISO, HILLARY, STRÖM, HUFELAND, &c.) and climates, so very generally predispose to dysentery, that it most commonly occurs either during, or subsequent to, these states of atmosphere. The effects of a high temperature upon the pulmonary functions, and consecutively upon the blood, and the biliary and other secretions and excretions, are such, as fully explained in the article DISEASE (§ 32—34.), as greatly to increase and disorder these latter, especially when the circulation is determined towards the abdominal organs by exposure to cold, or when assisted by other concurrent causes. — (*b*) Peculiar states of air, connected with the epidemic manifestations of the disease (HUXHAM, HORN, SCHMIDTMANN, &c.), and with certain features which different epidemics often present, whether referred to noxious exhalations floating in this fluid, or to extreme humidity, or to electrical conditions of it affecting the electro-motive states of our frames, most probably influence the organic or vital actions, especially the circulating and secreting functions, in such a manner — although slightly or latently — as to render them remarkably liable to this species of disorder upon exposure to any of the exciting causes. And it is not improbable that these states, as well as high ranges of temperature, favour the production and accumulation of morbid secretions in the biliary apparatus and in the prima via; and that these secretions, aided by consecutive causes, induce that form of action constituting the disease, although tending to their evacuation from the frame. — (*c*) An asthenic or exhausted state of the constitution, and of the digestive canal in particular, insisted upon by MARCUS, has certainly no mean influence as a predisposing cause, as shown by the greater prevalence of the disease in persons of this description in all climates and in most epidemics, in soldiers after very fatiguing marches, and in convalescents from fevers and other diseases. — (*d*) To these may be added the use of intoxicating fluids, as disordering both the digestive mucous surface and the secretions poured into the intestinal canal.

70. 2d. *Of the operation of causes which, either individually or conjointly, excite the disease.* — *A. Those which act locally, or affect chiefly the large bowels.* — (*a*) Many of these irritate or inflame the mucous surface of the cæcum, colon, and rectum. These bowels perform chiefly an excreting function; and consequently, when the excretions which are proper to them, as well as those which are poured into them from the small intestines, are allowed to accumulate, irritation or inflammation of the mucous surface, with inordinate action of the muscular coats, may be expected to occur. Irritating purgatives, injudiciously prescribed; a dose of rancid castor oil; foreign bodies lodged in the intestines; the too liberal use of fruit, especially that which is unripe (HORST, GIRTANNER, M'GRIGOR, &c.), or the fruit of hot climates (BÜCHNER, TWINING, myself, &c.); various indigestible substances; uncooked or imperfectly cooked meat or other food; pork; sour or bad wine; minute insects, or their ova and animalcules, in the water used for drink (LINNÆUS, SEBASTIAN, MAY, LATREILLE); and intestinal worms (constituting the *Dysenteria verminosa* of BONET, MAY, and BAUME); seem to act in this manner. — (*b*) Several agents determine inflammatory irritation of, and an inordinate flux of fluids to, the mucous surface of the large bowels, and their usual results. The causes just enumerated necessarily act in this manner, although not so immediately, nor to the same extent, as the following: — Exposure to cold, or cold and moisture, especially during or immediately after great atmospheric warmth, has been considered by BÜCHNER, STOLL, FISCHER, LARREY, and others, to produce the disease, and at the same time to impose on it a rheumatic character; whilst OSIANDER considers that, of itself, cold will not have this effect; and that the presence of morbid matters in the prima via, or the concurrence of some other cause, is necessary to its operation. The influence of the causes of common catarrh, insisted on by STRÖM, SCHLEGEL, and NEUMANN, although not so great as these writers suppose, is often well marked, especially in sporadic cases, and in some seasons. These, and several other authors, consider that the disease is catarrh, or catarrhal inflammation, of the large bowels, from remarking its prevalence about the same time as that affection. The sup-

pression of other evacuations, or the drying up of accustomed discharges, and misplaced gout (MUSGRAVE, STOLL, &c.) — the *Dysenteria arthritica* of SAUVAGES — are probably also concerned in its production in some instances; contingent circumstances causing the determination of morbid action to this quarter.

71. *B. Causes which disorder the secretions poured into the intestinal canal, and thereby affect its mucous surface.* — (*a*) Suppression of the secretions and excretions poured into the large bowels, especially the biliary fluid, and accumulations of mucus in the follicles, are not altogether without effect in causing or prolonging the disease, especially some of its protracted states; and several of the exciting agents, particularly cold, moisture, and malaria, partly act in this way. In many cases, both sporadic and epidemic, the absence of bile from the stools is a prominent symptom; the free discharge of this fluid being generally followed by more or less rapid amendment. Deficiency of this secretion evidently renders the chyle irritating or otherwise hurtful to the bowels; their mucous surface and follicles being moreover deprived of the salutary influence which a healthy state of this secretion exerts upon them; whilst accumulations of mucus in these glands irritate or inflame them, and favour the changes they usually present in fatal chronic cases. — (*b*) Other causes may operate by changing one or more of the secretions poured into the large bowels, either in quantity or quality. Thus, excess, and acridity with excess, or even with diminution, of these secretions, may irritate or excoriate the villous surface of the large bowels, during a prolonged retention of them occasioned by the conformation of the cæcum and colon, and by the spasmodic action of the muscular fasciculi of the latter. Many endemic causes act by disordering or vitiating the abdominal secretions and excretions, especially those of the liver (FORSTER, WENDELSTADT, FISCHER, BRÜNING, &c.); and antecedent diseases, as agues, remittents (PRINGLE, HUNTER, J. M'GRIGOR, FERGUSON, &c.), and continued or epidemic fevers (CHEYNE, O'BRIEN, &c.), operate in a similar manner. Preexisting affections, also, of the collatitious viscera, particularly of the liver (PISO, MENJOTUS, JUNCKER, BOAG, BIANCHI, J. JOHNSON, &c.) and pancreas, have a still more common and manifest agency; and it is probable that the influence of imagination, fear, and terror, mentioned by HOFFMAN, VOGEL, HARGENS, and NAUMANN, is exerted through the medium of the secreting organs, as well as upon the bowels themselves.

72. *C. Other causes seem to affect the intestinal mucous surface, the secretions poured into the canal, and the circulating fluids, disordering, also, the organic nervous influence by which these are controlled or modified.* — (*a*) The use of unripe and blighted grain (WRIGHT, GEDNER, &c.); of the flesh, and especially the viscera, of diseased animals (HOEPFNER, &c.); famine and unwholesome food (MUHLIUS, DESGENETTES, VIGNES, GRAVES, &c.); water holding putrid animal and alkaline substances in solution (PROCOPIUS, RHODIUS, MOEGLING, BIRNBAUM, BELL, &c.); and stale fruit or vegetables, act in this complex manner; putrid water especially exerting a septic action upon the digestive mucous surface, upon the circulation, and, ultimately, upon the soft solids. — (*b*) The causes which produce scurvy also give rise to scorbutic dysentery (§ 39.), by a nearly similar mode of operation. — (*c*) Morbid matters absorbed from ulcerating surfaces and parts, especially from sloughing, malignant, or phagedenic ulcers, by contaminating the blood, disorder the secretions poured into, and those elaborated by, the intestinal canal, so as frequently to occasion asthenic dysentery or diarrhœa. Of this form of the disease, numerous instances occurred in naval and army hospitals during the war. Mr. COPLAND HUTCHISON has devoted a chapter of his able "*Practical Observations on Surgery*," to this procession of morbid action, as it occurred in the navy, during his extensive public service.

73. *D. Lastly, some causes, and these the most energetic, affect the circulation, and, through it, the secretions poured into the bowels; ultimately contaminating, more or less, the solids as well as fluids, and disorganising the intestinal canal, if the disease be not arrested in its progress.* — (*a*) Miasmatous exhalations (LIND, KREYSIG, MICHAËLIS, &c.); the emanations from animal exuviæ (OSIANDER, &c.); or a mixture of both (ANNESLEY, myself, and others); and the effluvium proceeding from the bodies of a number of persons confined in small space, and in a close air (ATCHESON, &c.); by vitiating the air used in respiration, affect the whole mass of blood as it circulates through the lungs; those organs, especially the liver, whose office it is to eliminate injurious matters from the circulation, and thereby to preserve the purity of this fluid, necessarily forming, from the morbid elements furnished them in it, acrid, septic, or otherwise morbid secretions, which, as actually proved by experiment, irritate and excoriate the tissues with which they remain any time in contact. — (*b*) No doubt can be entertained by any one whose range of observation has embraced the more asthenic varieties of the disease, of the emanations which proceed either from the bodies of the affected, or from the fæcal discharges in circumstances of concentration, and of predisposition on the part of those exposed to them, being capable of producing and spreading the malady, either in the manner now stated in respect of other animal emanations, or through the medium of the saliva and upper portion of the digestive canal. The contagious properties of dysentery have been keenly disputed: WILLIS, PISO, STOLL, HORN, VANDER HAAR, RENTON, BALLINGALL, &c., asserting that it does not possess these properties; and HORSTIUS, FORESTUS, HILLARY, MORTON, PRINGLE, BARBOU, BRÜNING, BALFOUR, J. HUNTER, CHISHOLM, OSIANDER, NEUMANN, BONER, HARTY, HARGENS, G. BLANE, HUFELAND, PENADA, MICHAËLIS, HALLORAN, POOLE, CHEYNE, C. HUTCHISON, RUTHERFORD, JONES, and others, contending that it generally is infectious, especially when epidemic, or when occurring in camps, crowded ships, and under circumstances contended for above (§ 24.), and more fully illustrated in the article INFECTION. I believe that the views exhibited at these places are conformable with those entertained by every well informed and experienced observer and writer at the present day.

74. ii. MORBID CONDITIONS. — *A*. It is impossible to contemplate aright the changes constituting the various forms and stages of the disease, apart

from its causes and their modes of operation. — (*a*) Many of these affect more or less immediately the large bowels, without any previous constitutional derangement (§ 70. *A.*); and accordingly the morbid action is chiefly local, sthenic, or phlogistic in its character, as described under the first species of the disease (§ 12, 13.), and, in many instances, is simply inflammation of the cæcum and large intestines. — (*b*) In cases produced by suppression or vitiation of the secretions poured into the bowels (§ 71. *B.*), previous disorder, of either a latent or manifest kind, is necessarily present; diarrhœa frequently ushering in the disease; and the local affection, as well as the constitutional disturbance, evincing more or less of sthenic or asthenic characters, according to the state of the patient and the nature and concurrence of the causes. Some of these are also consecutive, complicated, chronic, or even symptomatic, hepatic dysentery belonging to this class of cases. — (*c*) In most such cases, and in many of the simple as well as of the most severe forms, congestion of the portal vessels, and obstruction of this part of the circulation, are concerned in the production and perpetuation of the dysenteric symptoms. — (*d*) Although dysentery is frequently occasioned by offending matters in the *prima via*, as believed by SYDENHAM, and many others, yet these matters are not so generally retained, either in the form of scybala, or in any other state, as CULLEN, and many more recent writers, seem to have supposed. — (*e*) There appears not to be sufficient evidence of the inflammatory forms being rheumatic in their nature, as suggested by VOGLER, STOLL, RICHTER, FISCHER, SIMS, SCHMIDTMANN, HUFELAND, HARGENS, &c.; although both complaints are sometimes allied, especially in respect of the exciting causes, as justly remarked by AKENSIDE, &c., and are occasionally associated, or consecutive the one of the other. — (*f*) In cases that proceed from unwholesome food or water (§ 72. *C.*), and in those caused by animal exhalations and infectious effluvia (§ 73. *D.*), although there may be at the commencement excited vascular action, the circulating and secreted fluids, and ultimately the soft solids, become more or less contaminated, and the disease assumes either a simply asthenic, or malignant form, disorganisation of the internal surface of the large bowels often taking place earlier than in other cases, with the exception of the hyper-acute inflammatory form met with in hot climates. In most of these malignant cases, the vitiated or morbid matters either conveyed into, or generated in, the circulation, in the process of their discharge by the emunctories give rise to an acrid or excoriating state of the excretions (or the morbid action excited in the secreting organs and surface occasions this change in the fluids they elaborate, as occurs in coryza, &c.), together with an increase of their quantity; but these changes frequently occasion at the commencement merely diarrhœa; the dysenteric symptoms being consequent upon the evacuation of the intestinal contents, and caused by the excoriation of the mucous surface, by the vitiated secretions, and by the irritation of the muscular coat; the local disorder reacting upon the constitutional disturbance.

75. *B.* In the early stage of most forms of the disease, the irritating effects of the morbid secretions and excretions are first exerted upon the cæcum and rectum; the latter being often so spasmodically constricted as not to allow the discharge of the more solid matters that may exist in the bowels; the retention of these and of the fluid secretions increasing the diseased action in the large, and ultimately in the small, intestines; ulceration, excoriation, sphacelation, &c. being frequently the result. — (*a*) In those cases which originate in a morbid state of the secretions, &c. (§ 74. *b. c.*), fæcal matters are generally fully evacuated before the tenesmus, distinctive of this affection of the rectum, comes on; the only morbid matters retained being those thrown out upon the mucous surface of the intestines, and poured into them from the collatitious viscera; but these are so vitiated and injurious, that their correction or evacuation becomes indispensable. — (*b*) In the asthenic varieties, to which most of such cases belong, the dysenteric symptoms are consequences chiefly of the vitiated secretions poured into the large bowels; this vitiation resulting from constitutional disorder, and the state of the circulating fluid: these morbid conditions should, therefore, be made objects of primary attention in the treatment of the disease. — (*c*) The matters poured into, and retained in, the large bowels, in asthenic cases especially, are to be considered as formed of elements which would be speedily noxious if retained in the circulation: they are excretions, in the strictest sense of the word, removed chiefly by the liver and digestive mucous surface; occasioning, from the morbid elements of which they are composed, and acrid properties they possess, severe irritation of the parts upon which they are retained, or along which they pass, in the progress of their discharge from the body. — (*d*) Granting that the dysenteric phenomena are thus produced, and that the morbid matters causing them are thus formed, it is manifest, that the mere suppression of these phenomena, or the retention of the morbid excretions, must be followed by disorganising effects upon the large bowels; and that the suppression of the secretions, being an arrest of the depurating functions, must be productive of a still more serious change in the circulating fluid, and ultimately in all the soft solids. — (*e*) In many cases of all the forms of the disease, the excreting function of the skin is more or less completely put a stop to, and that of the kidneys materially impeded; the excretions of the intestinal canal, and frequently those of the liver, being in excess, as well as otherwise disordered, — conditions, equally with the foregoing, requiring to be made the basis of therapeutical indications. — (*f*) Whilst, therefore, the cutaneous and urinary excretions are interrupted, the sudden arrest of those poured into the intestinal tube would endanger the patient, by increasing the morbid state of the circulation, and by superinducing either fever of a bad form, or inflammation and its consequences in the abdominal organs, or dropsy. — (*g*) In the varieties consequent upon a morbid state of the secretions poured into the bowels, the small intestines are frequently also diseased, but in a less degree than the large, as they present no obstacle to the speedy transit of these secretions along them, excepting near the cæcum, where they are usually more altered than in any other part.

76. *C.* The most frequent *association of dysen-*

tery, and one often very imperfectly manifested by symptoms, is that with *disease of the liver*. — (*a*) The *hepatic affection* may be *primary*, in which case it is either *functional* or *structural ;* the *functional disorder* consisting — *α.* of torpid or suppressed function and passive congestion ; or, *β.* of increased secretion, and of the vascular determination requisite to such increase ; — the *structural disease* being — *α. acute*, or consisting of active congestion, or inflammation, or of abscess in the substance of the organ ; or, *β. chronic*, with various alterations, occasioning obstructed circulation through the portal vessels, and an insufficient as well as a morbid biliary secretion : in these states, the bowel complaint may be viewed as *symptomatic* of the hepatic disease. — (*b*) The affection of the liver may be *a coëtaneous effect*, with that of the bowels, of the same causes : in this case, the former will be of the *functional* and *acute* kinds enumerated above ; *abscess* occasionally supervening in the advanced stages of the associated malady. This form of complication is most common in warm countries, where, the causes of both diseases being nearly the same, these associated results may reasonably be expected. — (*c*) The hepatic change may be *consequent upon the dysenteric malady*, especially in its more chronic states. In cases of this description, the substance of the liver is either inflamed, softened, and discoloured ; or it contains one or more purulent collections, with or without any surrounding cyst ; the matter being sometimes infiltrated into the softened, and apparently not inflamed structure of the organ. Here the hepatic change is contingent upon the bowel disease, in its advanced stages, and is favoured by constitutional vice or injudicious treatment, or both ; and occasionally by the nature of the predisposing and exciting causes, as by habits of intemperance. In these three states of this important complication, the symptoms are often obscure. In the *first* and *second*, they are frequently very manifest ; but, in the *third* especially, they seldom admit of more than suspicion, arising from the obstinacy of the disease, the lurid and lightly jaundiced appearance of the surface, the morbid state of the biliary and other secretions, and the irregular or hectic form of febrile disturbance ; chills, rigors, or even horripilations, being seldom felt. The severity, also, of the dysenteric symptoms sometimes masks, or draws off the attention of both patient and physician from, the hepatic disorder.

77. The frequency of the *third, latent, or superinduced form* (§ 76. *c.*) *of hepatic complication*, especially in the more chronic cases of dysentery, has given it much practical importance ; and, as a knowledge of the manner in which it arises is necessary both to its prevention, and to its removal, several attempts at explaining the occurrence have been made. These have been remarkably vague and unsatisfactory. I shall therefore state, with but little reference to them, the only ways in which it can be brought about. — 1st. The irritation and increased vascular action in the intestinal canal must necessarily be followed by augmented circulation through the portal vessels, by a more copious secretion of bile, and, if at this time the liver be congested, or its ducts loaded, and especially if the blood abound with excrementitious elements, by an acrid and morbid, as well as augmented, secretion. — 2d. The absorption of injurious ingesta, or of morbid matters formed or retained in the *primæ via ;* or of puriform matter from the inflamed or ulcerated mucous surface, into the mesenteric veins and portal circulation, must necessarily be productive of the following effects : — *α.* A vitiated, or an increased, or both a vitiated and increased, secretion of bile ; — *β.* Irritation of the structure of the liver, followed by inflammation or softening, often rapidly passing into suppuration, without much tumefaction or previous sthenic or phlogistic action ; — *γ.* The deposition or infiltration of puriform matter in the substance of the organ, especially when a puriform fluid is carried from the diseased bowels ; — *δ.* Inflammatory action, and its consequences, in the vessels along which the morbid matters pass, and on the blood they contain. — 3d. It is extremely probable that inflammation extends from the ulcerated mucous or submucous membranes to the radicles of the veins, and from thence along their ramifications and trunks, the product of the morbid action mixing with and contaminating the blood which circulates to the liver, as in the foregoing — the 2d — case, and producing the same effects, the inflammatory action extending more or less to the ramifications of the portal vessels. It seems most probable that the above are the chief modes in which disease of the liver is superinduced in the course of dysentery ; and that one or all of them more or less obtain, in different cases, or even in the same case. Without, however, denying that the procession of morbid action contended for by some writers, and about to be noticed, sometimes takes place, I may state, in support of the preceding, that M. RIBES (*Révue Méd.* 1825, t. iii. p. 5. *et seq.*) found puriform matter in the veins, and inflammation of their coat, in several cases where purulent collections had formed in the liver after ulceration of the inner surface of the bowels. M. GENDRIN (*Hist. Anat. des Inflammat.* t. i. p. 707.) observed similar changes in the veins in the vicinity of intestinal ulcers ; and M. ANDRAL (*Anat. Pathol.* vol. ii. p. 421.) detected false membranes lining the ramifications of the vena porta, in a person who died from disease of the bowels and liver. The very frequent collections of pus, and puriform infiltrations in the mesenteric glands, in the protracted states of dysentery, should also not be overlooked, as supporting the above inferences, especially if we take into account the intimate connection of this part of the absorbent system with the veins contributing to form the portal system. — 4th. It has been supposed by M. BROUSSAIS and his followers, that inflammatory action extends from the small intestines, along the bile ducts, to the liver ; and some cases, that have been observed by him, Mr. ANNESLEY, M. ANDRAL, and myself, where inflammatory action or its results were seen in the common and cystic ducts, would seem to favour this view, if they could not be otherwise accounted for. It may be admitted, that the extension of disease to the small intestines is very frequent in the hepatic complication ; but it is most probably excited, as stated above (§ 75. *c.*), by morbid bile, which also may have produced the inflammatory appearances occasionally observed in the ducts by which it is excreted. — 5th. The irritation in the bowels, or the operation of substances given

to cure the disease, may be sufficient to excite a sympathetic irritation, and its occasional consequence—suppuration—in an asthenic state of the system, in an organ so intimately connected, in its circulation and nervous influence, with the bowels, as the liver is. This, certainly, may possibly occur, but we have no proof of it; nor, indeed, does it admit of unexceptionable evidence. It is, however, very likely that the constant, or injudicious, use of calomel and irritating purgatives, when the substance of the liver is congested, and the bowels in a state of irritation, may give rise to abscess or other structural change in the liver; whilst, on the other hand, a similar practice during hepatic disease, may superinduce dysentery, without removing the primary complaint.

78. *D. Chronic* as well as other forms of dysentery may be associated with disease of the spleen, pancreas, or mesenteric glands; either, or even all, of which may occur, and indeed often does occur, in the same case, especially where endemic causes are in operation,—the hepatic complication being sometimes also superadded.—(*a*) As respects the disease of the *spleen* and *pancreas*, the procession of morbid phenomena is not often manifest; but these lesions are most frequently seen where dysentery has arisen from these causes, or has been consequent upon periodic or continued fevers; the splenic enlargement having often preceded the bowel affection.—(*b*) In respect of the lesions of the *mesenteric glands*, there can be no doubt of their being the results of intestinal irritation or ulceration; the most remarkable changes, especially purulent collections, having been seen in those corresponding to the seat of large ulcers.

79. *E. Relapses*, or repeated attacks after the patient has once had the disease, are very common, especially if he remain exposed to the endemic or other exciting causes, as in hot climates and during campaigns or sieges; or if he be addicted to intoxicating liquors. They are also frequent when the complaint has been associated with affections of the liver, or spleen, or consequent upon obstinate intermittents, and when recovery had not taken place until after it had assumed a chronic state. In such circumstances, slight errors of diet, or exposure to cold, and noxious emanations, will often speedily reproduce it. The numerous *relapses* observed in unhealthy localities, and amongst soldiers and sailors, are chiefly attributable to a too early discharge from medical care, and return to irregular habits and injurious exposures; and to the abrupt resumption of a stimulating diet.

80. X. Treatment.—Towards the close of the last century, and at the commencement of this, the treatment of dysentery, as set forth in various papers and works, by authorities confided in at the time, was absolutely below the standard furnished by the ancients, and by writers in the sixteenth and seventeenth centuries, not merely in respect of the knowledge and appropriation of therapeutical means, but even as regards the justness of pathological views; without which, indeed, no medicinal agent can be even safely prescribed. If any one think this assertion paradoxical, let him refer to the sources pointed out to him in the sequel; and, with a slight allowance for phraseology, he will perceive that, as to this disease, as well as to many others, knowledge has not been always progressive; and that the unsound and narrow doctrines in medicine, that sprang up soon after the middle of the last century, have contributed not merely to its retardation, but to its retrogression. The cant about experience, so recently raised, and kept up by those the least entitled to the distinction it should rationally confer, threatens an equal, although very different, obstacle to the progress of medical knowledge, by being made without reference to the fact, that experience in medicine consists not in opportunities, or the number of objects seen, or even in the repetition of the same experiments or observations; but in the qualities of the mind of the observer; in due preparation for the task by literature, philosophy, and science; and in the application of them to the objects successively investigated. Thus qualified, opportunities will seldom be wanting, and the results will soon accumulate so as to enrich the mind of the inquirer to an extent to which the empirically—the ignorantly experienced, will ever remain a stranger; and will be of such a description, as can be attained only by a mind so constituted and so instructed.

81. i. Of Acute Dysentery.—*The general indications of cure*, are—1st. To remove the causes, predisposing, exciting, and concurring; and, when it is requisite, or circumstances will permit, to place the patient in a pure and open air.—2d. To subdue inflammatory action by antiphlogistic measures, when its presence is rationally inferred, or when the state of the attendant constitutional affection will admit of them, or to the extent to which it may be benefited by them.—3d. To promote the excretions of the skin and kidneys, and to determine the circulation to the cutaneous surface.—4th. To remove, by gentle and appropriate means, the morbid matters that may remain or collect in the prima via, and to dilute and correct them.—5th. To protect the mucous surface of the bowels from their irritating and excoriating action.—6th. To correct the morbid condition of the circulating and secreted fluids, in the asthenic and malignant varieties, or whenever this condition may be inferred, conformably with the views explained in the articles Blood, Debility, Disease, and Symptomatology.—7th. To support vital power, if it fail in the progress of the sthenic forms, and early in the asthenic varieties, as being indispensably requisite to the correction of a morbid state of the fluids.—And, 8th. To palliate urgent symptoms, or to arrest such as are attended by immediate danger, as soon as they appear. An appropriate use of energetic means will generally accomplish, simultaneously, two or more of these intentions.

82. *A.* Treatment of the Sthenic Forms.—(*a*) *Bleeding*, general or local, or both, according to the severity of the disease and constitution of the patient, and repeated accordingly, is generally requisite. The application of a number of leeches to the abdomen, in the slighter cases, or after venæsection in the more severe attacks, and of fomentations, or warm poultices, frequently renewed, after the leeches have fallen off, will give much relief. If tenesmus or dysuria be urgent, and pain be felt along the sacrum, the leeches may be placed there or on the perineum, or cupping on these parts may be directed. Although vascular depletion is most serviceable early in the disease, yet it should not, in these forms, be

neglected in the advanced stages, when it has been either omitted, or directed in too small a quantity, unless the symptoms are such as contra-indicate it. When fixed pain is felt in the region of the cæcum, or in the course of the colon, leeches should be repeatedly applied until it is removed.

83. (*b*) *Purgatives and laxatives* have been long recommended, and employed with a most injurious want of discrimination, on the supposition that the disease is caused, and kept up, by the lodgment of fæcal matters in the colon; and yet, notwithstanding the general fallacy of the views which led to their employment, when judiciously selected and combined, they are often of much service. It must be obvious that such purgatives as act principally on the colon and rectum are not suited to an inflammatory disease of these parts; and that, when there can be no collection of fæcal or morbid matters to remove, the exhibition of them will merely aggravate the symptoms. It is, therefore, most important to ascertain, upon entering on the treatment of a case of the disease, as far as may be done, whether or no such matters may exist to the extent of requiring these remedies. If the patient has been seized after a constipated or even natural state of the bowels, if hardness and fulness can be felt in any part of the colon or cæcum upon careful examination of the naked abdomen by the hand; if, together with these, the tongue be much loaded, and the matters evacuated offensive from the commencement; if the patient complain of a sense of stuffing or fulness in the course of the large bowels, and if pellets of fæces be evacuated; suitable evacuants are indicated. But, if the disease has been preceded by diarrhœa, or by free fæcal discharges, as it frequently is, they should either be withheld for a time, or very cautiously employed; the selection, also, being made with much care. When the patient is well informed, his sensations and account of the early symptoms should be duly weighed and attended to. Much mischief may arise, and discredit be reflected on the practitioner, by neglecting this very obvious indication — by following blindly the dictates of either unsound theory or worthless authority, instead of being guided by common sense. I have repeatedly known persons who have been accounted ignorant, but who were not necessarily without sound sense, complain bitterly, and lose all confidence in their medical attendant, and hopes of recovery, when directed to take cathartics, after, as they have expressed it, their insides had been nearly purged out of them. — When, however, the patient has not had any feculent discharges for a considerable time, during the progress of the disease, although they may have been copious and frequent before the accession of the dysenteric symptoms, a mild purgative should be prescribed, as being much less irritating than the retention, even for a short time, of morbid excretions; and its operation should be promoted by an emollient enema. Cooling or oleaginous purgatives are preferable to others: and perfectly sweet castor or olive oil; or the following preparation, recommended by VOGEL, and praised by SCHMIDTMANN; or Formulæ 144. and 790.; or either of the subjoined electuaries; may be tried: —

No. 199. ℞ Extr. Jalap. Resin. gr. xij.; Sap. Venet. gr. vj.; tere probe cum Olei Olivæ (vel Ol. Lini. vel Ol. Amygdal. Dulc.) ℥ij. Capiat ℥ss. omni nocte.

No. 200. ℞ Pulv. Jalap. ʒss.; Potassæ Supertart. ʒiij.; Pulv. Ipecacuanhæ gr. j.; tere bene simul, et adde Pulv. Rad. Glycyrrh. ʒjss.; Syrup. Zingiberis (vel Theriac. Commun.) ℥ss. M. Fiat Elect., cujus sumatur dimidium.

No. 201. ℞ Potassæ Supertart. in Pulv. trit. ℥jss.; Potassæ Nitratis ʒj.; Confect. Sennæ ℥ij.; Syrup. Aurantii q. s. ut fiat Electuarium, cujus capiat coch. j. vel ij. minima; super bibendo dose mist. seq.

No. 202. ℞ Magnes. Ustæ ʒj.; Camphoræ subactæ gr. ij.; tere et adde Vini Ipecacuanhæ ʒjss.; Aquæ Menth. Virid. ℥vijss.; Syrup. Aurantii ʒij. Fiat Mist., cujus capiat coch. iij. larga, cum dose Elect. supra præscripti.

If castor oil be employed, it will be advisable to exhibit it on the surface of some mucilaginous or emollient vehicle, and to add to it a few drops of laudanum. Whatever may be the purgative prescribed, it should be assisted by emollient and laxative injections, such as F. 144.; or of tepid water; or fat mutton broth, well strained; or linseed, or sweet, or almond oil. Tenesmus is sometimes aggravated by large enemata. They should, therefore, be of small bulk; or the irritation should be first allayed by an opiate, or an opiated and litharge (see F. 682, 683.), or a belladonna, suppository.

84. (*c*) *Refrigerants* may be exhibited, either alone, or with diaphoretics and diuretics, and in emollient and mucilaginous vehicles (F. 866.); especially after the above means have been employed, and when there are much fever and sense of internal heat. The nitrate of potash may be given with ipecacuanha and opium (F. 642.), or with small doses of camphor (F. 36. 460.), and of ipecacuanha (F. 39.); or, in solution with spirit. æther. nit. (F. 436.), liquor ammoniæ acet., and opiates. The muriate of ammonia may likewise be exhibited, as in F. 352. and 431.

85. (*d*) *Opiates, &c.* are productive of the greatest benefit, after depletion; and should be prescribed in large doses. If fæcal matters have been carried off, during the diarrhœa often ushering in the disease, they ought to be exhibited directly after depletion; and, in all cases, after the operation of a purgative. But much will depend upon the medicines that may be given with them. Of these, *ipecacuanha* is the most important. From two to four grains of opium with as much ipecacuanha should be prescribed for a dose; and, if not retained, repeated in a short time. These should be taken in the form of pill, which may be washed down by a refrigerant and emollient draught; or the ipecacuanha may be given in a similar vehicle, with from thirty to forty drops of the *tinct. opii comp.* (F. 729.), and repeated according to circumstances. This medicine will ameliorate the symptoms and determine to the cutaneous surface, especially if its action be promoted by the slightly *warm bath*, or semicupium or hip-bath; and by frictions of the surface subsequently. After a decided effect has been produced by these, DOVER's powder may be prescribed at short intervals, so as to keep up the action on the skin; and the abdomen should be swathed in flannel. Opiates may be employed also in the mucilaginous enemata already recommended (F. 143. 147. 152.), and in the form of suppository.

86. (*e*) *External derivatives* and *rubefacients* are sometimes of service after depletion and the above means have been duly employed. A large blister may be placed upon the abdomen; but it should be removed as soon as it has produced redness, and be followed by warm bread and

water poultices. The turpentine epithem will be found still more generally of use, and will not so much increase the irritation experienced in the urinary passages as the blister frequently does. In cases where this symptom is severe, mucilages with soda, nitre, small doses of camphor, and opium, will give relief. When it is urgent, tenesmus is also a prominent feature; the means already advised, especially local depletions, either from the sacrum, or from the perineum, small emollient and cooling injections, and opiate suppositories, being the principal remedies. If the sthenic forms of the disease yield not to the treatment now advised, or if it pass into the chronic state, recourse must be had to such of the methods of cure, and medicines, hereafter to be noticed, as may seem most appropriate to the circumstances of the case. When much debility is complained of, after tormina and tenesmus have been removed by an antiphlogistic treatment, mild bitters, as the infusion of calumba, or infusion of cinchona, with liquor ammoniæ acetatis, tinctura camphoræ compos., and small doses of the vinum ipecacuanhæ, will be productive of much benefit. Costiveness should be carefully guarded against, by the occasional exhibition of a gentle purgative, as directed above (§ 83.), and of aperient and emollient enemata.

87. *Among Europeans in hot climates,* the disease requires a prompt and decided use of antiphlogistic remedies, inasmuch as the inflammatory action is, in these cases, more intense, and arrives more rapidly at an unfavourable termination. The treatment, however, in principle, is the same as that advised above. The good effects of large doses of ipecacuanha and laudanum — from half a drachm to a drachm of each — after bleeding, have been shown by Mr. PLAYFAIR; and of smaller doses — from three to seven or eight, with an equal quantity of some bitter extract — also after requisite depletions, have been found equally beneficial by BALMAIN and TWINING; whilst the impropriety of an indiscriminate use of mercury, especially calomel, in this disease even as it occurs in India, has been acknowledged by these writers, Mr. ANNESLEY, and others. Although dysentery, in persons thus circumstanced, assumes the inflammatory form, or that of *colonitis* (as it has been improperly called by some writers, as the rectum, cæcum, and often the small intestines, are also affected), especially soon after their migration to a hot climate; yet the attendant constitutional affection is not always of a sthenic kind, but frequently assumes either the simple asthenic (§ 25.), or the bilio-adynamic (§ 28.), or malignant forms; especially in those who have resided long in the country, and where the endemic causes abound. In many cases, also, the symptoms are acutely inflammatory at the commencement, and rapidly pass into a very asthenic state, even before either of the unfavourable changes pointed out above have begun. In such, the antiphlogistic treatment should be early employed, and exhaustion met, as soon as its signs appear, by the remedies about to be recommended for the asthenic varieties. In some instances, also, particularly in persons circumstanced as now stated, the dysenteric affection is entirely symptomatic, either of abscess in the liver, or of interrupted circulation through the ramifications of the vena porta, — pathological conditions which should be carefully investigated, as they require very different plans of cure. (See LIVER — *Chronic Inflammation and Suppur. of.*)

88. *B.* OF THE ASTHENIC FORMS. — (*a*) In the *simple asthenic form, ipecacuanha* with *opium,* the *warm bath,* and gentle *purgatives* with aperient and *emollient enemata,* conformably with the views now stated (§ 83.), will frequently remove all disorder. In most instances it will be requisite, and particularly if the biliary secretion be obstructed or vitiated, to give a full dose of *calomel* (from ten to fifteen grains) with two or three grains of opium, and one of ipecacuanha, a few hours before the purgative is exhibited; and, when dull and constant pain is felt in any part of the abdomen, or tenderness on pressure, a number of *leeches* should be applied, and be followed by the warm turpentine epithem. Venæsection has been found injurious in this form of dysentery, especially when epidemic during very moist seasons. An ipecacuanha *emetic* will often be of service at the commencement; but if retching become urgent, opium in the form of pill, sinapisms on the epigastrium croton oil rubbed on the abdomen; the warm bath, or hip bath, or semicupium; and nitre, with emollients; will both relieve this symptom, and allay the tormina and tenesmus. Mucilaginous mixtures, with paregoric elixir and vinum ipecacuanhæ, are generally serviceable. Emollient clysters and *suppositories,* with opium, are also requisite. I have seen the preparations of *hop* productive of great relief in this form. They may be prescribed with camphor mixture and liquor ammoniæ acetatis, or with *emollients* (F. 839, 840. 871.) and *diuretics.* In the more severe cases, or when the disease does not yield to the above remedies, full doses of *camphor,* with opium, or with DOVER's powder, or with the addition of *nitre* (F. 36. 39.), may be given every five or six hours, and pieces of flannel made warm and moistened with either of the *liniments,* F. 297. 307. 311., be kept upon the abdomen until relief is obtained. Although fæcal matters and disordered secretions may have been evacuated before the dysenteric symptoms had appeared, yet it will be necessary to have recourse to mild *purgatives,* from time to time during the progress of the disease, in order to excite the functions of the excreting organs, and to evacuate such morbid secretions as may have collected. The purgatives and aperient enemata recommended above (§ 83.) may be exhibited, or the compound infusion of senna with an equal quantity of infusion of calumba or gentian, and a little soluble tartar and compound tincture of cardamoms. If the disease be likely to become obstinate, equal quantities of *turpentine* and *castor oil,* taken on the surface of milk, or of an aromatic water, and repeated every second or third day, will be most efficacious. After the tormina and tenesmus are removed, *mild bitters* and *tonics;* and, in some cases, *astringent tonics* and *absorbents,* with the treatment advised in the article DIARRHŒA (§ 29—33.), will generally remove all remaining disorder, if the state of the secretions and of the bowels be duly attended to. If the complaint degenerate into a *chronic form;* or debility become a prominent feature; and if the excretions indicate, with the state of the surface and tongue, a progressive deterioration of the fluids and soft solids;

the means about to be directed for these conditions must be employed.

89. (*b*) In *the nervous or typhoid, and malignant forms* (§ 26.), the *sixth* and *seventh indications* of cure should be particularly entertained, and with due reference to the *third, fourth,* and *fifth*. From one, to three, four, or even more grains of *camphor* may be given every three or four hours, with three of *hydrargyrum cum creta*, two of *ipecacuanha*, and one of *opium*, in the form of pill; and if it be thrown off the stomach, it should be persisted in nevertheless. The patient should also be put into a *warm bath;* the temperature of which ought to be gradually raised while he is immersed in it; and, having been well rubbed upon coming out of it, be placed between warm blankets, in order to promote the action of this medicine on the skin. This intention will be furthered, if the stomach be not very irritable, by draughts containing liquor ammoniæ acetatis, potassæ nitras, or any other appropriate neutral salt. — The action on the skin should be kept up for a considerable time by the medicine, and promoted by *emollient diluents*, such as the decoction of liquorice or of linseed, &c. If these means fail of giving relief, flannel wrung out of hot water, and moistened with spirits of turpentine, should be applied to the whole abdomen, and allowed to remain as long as the patient will endure it. The usual effects of this epithem are, a most copious perspiration, with burning heat of the skin where it is applied; and, consequently on these, a total remission of the tormina and tenesmus, followed by sound repose procured by the pills which have been taken. In advanced stages of the complaint, when the internal congestion or determination is very great, and the skin is harsh, dry, and livid, repeated applications of this epithem, as warm as the patient can endure it, are sometimes requisite to its full effect. In a case which I lately treated under very unfavourable circumstances, it having been consequent upon continued fever, in a lady long subject to disorders of the colon and rectum, a quart of the spirit was thus employed before redness of skin was produced; although it was warmed by immersion in warm water before the flannel was moistened with it. This patient ultimately recovered. To these means may be added, the *emollient* and *anodyne enemata* already recommended; and *suppositories* of opium, if tenesmus and dysuria be urgent, and the rectum very irritable.

90. In these dangerous forms, notwithstanding full evacuations of fæcal matters may have ushered in the disease, it will be requisite to carry off, from time to time, by suitable purgatives, such morbid matters as may have accumulated. To many cases, the purgatives and enemata prescribed above will be appropriate; but where the stools are very offensive, or contain much dark blood; when the powers of life are depressed; or when stupor is present; and more especially if petechiæ or discolouration of the skin be observed; the draught with castor oil and turpentine directed above (§ 88.), or F. 216., should be exhibited, and its effect promoted by either of the enemata, F. 135. 150. and 151. In this state of disease, it is important to evacuate morbid matters by such means as will at the same time restore the tone of the digestive mucous surface, and of the vessels opening on it; and I believe that there is none that exerts this influence more efficaciously than those now named. Next to these, rhubarb in powder, with camphor, and calomel, or hydrarg. cum creta; or cinchona, with senna (F. 86.); or the infusion of gentian and senna (F. 266.); or infusions of cinchona and rhubarb; or the preparations of cusparia and rhubarb; will be found the most efficacious.

91. If the powers of life be much depressed, the circulating and secreted fluids will generally become more and more vitiated. Our chief efforts should then be directed to counteract this tendency. With this view, the decoction or infusion of *cinchona* and *serpentaria*, with *camphor*, and small doses of *nitrate of potash*, or of *muriate of ammonia*, or with the *chlorate of potassa*, or of *soda*, may be prescribed; and either of these, or the *chlorate of lime*, may likewise be administered with camphor in mucilaginous enemata, especially when the stools are very offensive; taking care to prevent the accumulation of morbid secretions by occasionally resorting to the aperient draught and enema directed above (§ 90.). The infusions of *cascarilla*, of *calumba*, or *cusparia* (F. 201.), or the decoction of *tormentilla* (F. 78.), may likewise be taken, with these or similar additions. When the evacuations are copious, as well as morbid, their excess occasioning vital depression, it will be necessary to control them by adding *opium*, and the usual *astringents*, to the *tonics* now mentioned; and to excite the functions of the skin by the warm bath, frictions of the surface, and the application of the *turpentine epithem* to the abdomen. The terebinthinated medicines, also, already mentioned, are the most active aperients, and astringents at the same time, in this complaint, as well as the most certain and beneficial in their effects. Upon the whole, these severe states of the disease require similar remedies to those enumerated in the articles BLOOD (§ 157. *et seq.*), and DEBILITY (§ 38)., and in the sections on the treatment of the *adynamic* and *malignant* forms of FEVER.

92. (*c*) The *bilio-adynamic* form presents considerable diversity of character in different seasons and epidemics, and requires a modified treatment accordingly. When there is no tenderness or fulness at the epigastrium, an *ipecacuanha emetic* will generally be serviceable; but its operation should be followed by a full dose of *calomel;* and that, in a few hours, if fæcal matters have not been already evacuated, by either of the mild *purgatives* prescribed above (§ 83.), and by *emollient injections*. When the patient complains of a burning sensation in the colon, or of scalding in the rectum, with great irritability, *nitrate of potash*, or *muriate of ammonia*, should be given in emollient or mucilaginous vehicles; and an opium and litharge *suppository* (F. 683.) administered; a similar combination of refrigerant and mucilaginous medicines being afterwards exhibited in enemata. In some cases, this form approaches nearly to that of sthenic vascular action, and then leeches are required to the abdomen; and will be most advantageously followed by the turpentine epithem. After these remedies, small doses of camphor, hydrargyrum cum creta, and DOVER's powder, or simple ipecacuanha, may be taken every two or three hours, and the warm bath, in

the manner above directed (§ 89.), occasionally resorted to. If this variety be characterised by great vital depression, the treatment already directed (§ 91.) must be employed. In all its states, and stages, it will be requisite to evacuate the morbid bile that is secreted, and to correct the diseased action in the liver; but beyond one or two full doses of calomel, either with or without opium, this medicine should not be persisted in; as it increases the irritation of the colon and rectum, and depresses vital energy. The hydrargyrum cum creta, as now directed, will be more efficacious; especially when assisted by the above means, and by emollient and mucilaginous diluents.

93. *In the Dark Races*, dysentery assumes the simply asthenic or malignant forms. In them, the treatment may safely be commenced by an ipecacuanha *emetic*, and followed by a *purgative*, the *warm bath*, and warm *diaphoretics*. Early in the disease, calomel with rhubarb and ginger; or powdered jalap with cream of tartar and some warm spice, will be appropriate; but enemata are also required. The habits and modes of living generally adopted by these races, independently of their more lax fibre, and much less tendency to inflammatory action, require an earlier and more active use of tonics, stimulants, astringents, and aromatic spices, with opium, than can often be safely attempted among Europeans. Purgatives, also, should be of a more stomachic and warm kind, and the functions of the skin especially promoted. The combination of ipecacuanha with tonics, astringents, opiates, and absorbents, according to the peculiarities of the case, is generally extremely efficacious after fæcal matters have been evacuated. Camphor, catechu, the hot spices, and warm clothing, with the rest of the tonic and astringent treatment advised for the *chronic state*, and in DIARRHŒA (§ 37.), should be resorted to, as soon as exhaustion supervenes, or when the disease becomes protracted. To Europeans long resident in hot climates, a nearly similar method to that now recommended is applicable, if the hepatic functions be regular; but, as in them the liver is very seldom unaffected, the means directed for the chronic form, which it usually assumes, is more generally appropriate; and the treatment should chiefly depend upon the nature of the primary or attendant hepatic disease.

94. *C.* TREATMENT OF THE COMPLICATED STATES. — (*a*) The association of *acute dysentery* with *inflammation of the liver* (§ 34.) requires decided and early general or local depletion, or both, followed by cooling purgatives, sufficient merely for the evacuation of morbid secretions. In this complication, the morbid state of the bile, and the rest of the hepatic symptoms, are the consequence of inflammation, and can be removed only by *antiphlogistic treatment*, and not by inordinate doses of mercury, which will merely over-excite an already excited organ, and accelerate suppuration. Refrigerant, therefore, and cooling aperients, as the supertart. and tartrate of potash, tamarinds, manna, or the soda tartarizata; antimonial or ipecacuanha diaphoretics; small doses of camphor, with nitre and opium; cooling and emollient enemata, and a very low diet; constitute the principal means of cure. When the patient complains much of burning heat or soreness in the abdomen, with scalding, &c. in the anus and urethra, the nitrate of potash, with sub-carbonate of soda, and spirit. æther. nit., in emollient vehicles; the muriate of ammonia in mucilaginous mixtures; suppositories of opium; and local depletions, followed by the warm terebinthinate epithem over the abdomen; are chiefly to be depended upon. If blisters be applied, they should be surrounded by a number of leeches, the former being removed as soon as they have produced redness, and succeeded by warm poultices. As the substance of the liver is generally more or less acutely inflamed in this complication, and as mercurials will not readily produce their specific effects, or act beneficially, whilst this state continues, but will rather increase it, the exhibition of them with this intention can only occasion abscess, irritative fever, and exhaustion; and furnish one of the most injurious proofs of the "*nimia diligentia*," which is but too common in the treatment of this as well as of hepatic disease. Can any practice be more empirical, than to give the same substance to subdue over-excitement, which we find the most active in rousing torpid function, of an organ? Having removed the acute symptoms by the above means, the insertion of one or two *setons* in either side, and keeping up a free discharge from them for a long time, with appropriate diet and regimen, and change to a healthy air, will generally complete the recovery. When the dysenteric affection is merely *symptomatic of abscess in the liver*, the treatment advised for this condition (see LIVER — *Suppuration of*) should be employed.

95. (*b*) The *complication with disease of the spleen* is most common after intermittent and remittent fevers, and in unhealthy localities; and the symptoms are either but little inflammatory, or more or less asthenic. Local depletions even are seldom required in its treatment. Warm stomachic aperients, as cinchona with rhubarb, ipecacuanha, and aromatics; emollient enemata with anodynes; the warm bath, followed by frictions of the abdomen with either of the *liniments*, F. 297. 311., upon coming out of it; ipecacuanha with strichnine, or sulphate of quinine, or sulphate of iron, or with tonic extracts; camphor with warm diaphoretics, and the medicines directed for the more chronic states, which it more frequently assumes, or passes into; are the most appropriate in this state of the complaint. When dysentery follows *continued or periodic fever*, disease of the liver or spleen, or of both, should be dreaded, as well as its rapid termination in ulceration; and means, conformably with what has now been advanced, should accordingly be promptly put in practice. The most efficacious of these, are early local depletions — but only when the symptoms clearly indicate the propriety of resorting to them; the terebinthinate epithem applied to the abdomen, or large blisters, followed by poultices, and repeated according to the urgency of the case; with the rest of the treatment directed for the asthenic states, according to the peculiarities of the case.

96. (*c*) The association of *acute dysentery with scurvy*, requires the removal of the exciting causes; a suitable diet, especially fresh meat and vegetables; the liberal use of *lime juice*, with sugar, mucilage, and opium; the carbonate of potash or soda in effervescence, with an excess of lime juice, particularly when the secretions re-

quire evacuation by gentle means; the decoction of cinchona with muriatic acid, or citric acid, or chloric æther; and the draught and enema consisting of turpentine and castor oil, when the hæmorrhage is considerable, and the abdomen tumid or tympanitic, or when the state of the discharges indicate the propriety of exhibiting a purgative. If lime juice is not to be procured, lemon juice or citric acid should be substituted. When the debility and oozing of blood from the bowels are great, the tincture of the muriate of iron may be given in the infusion of quassia, or the infusion of catechu may be exhibited with other astringents, and with aromatics, warm spices, and the tinctura opii comp. (F. 729.). Carbonate of *ammonia* may also be taken in effervescence with an excess of *citric acid*, or lime juice; ipecacuanha, aromatics, and the above preparation of opium, being added. In the more urgent or obstinate cases, the warm *nitro-muriatic solution* should be daily applied over the abdomen, or added to mucilaginous and emollient enemata. It may likewise be used as a gargle, when the state of the mouth requires such means. The nitro-muriatic acids may also be taken internally with small doses of the compound tincture of opium, when citric acid or lime juice cannot be obtained. The *chlorates* may be prescribed with camphor, and opium, in mucilaginous vehicles; and administered, in a similar form, as enemata. During treatment, the diet should be regulated, and the excretions carefully observed. When the bile is scanty, and the stools without fæces, a few grains of blue pill may be given at night, and a full dose of magnesia in aromatic water the next morning, followed immediately by a glass of lemonade, or a draught with lime juice or citric acid, — the combination thereby formed in the stomach proving an agreeable purgative; or the hydrargyrum cum cretâ, with rhubarb, may be taken at bedtime, and the oily draught and enema already mentioned the following day. Aromatic confection, with magnesia; or cretaceous and other absorbents, with ipecacuanha or Dover's powder; are also serviceable, when the bowels are much relaxed and griped, and the stools become frothy and acid. Cretaceous medicines should not be given while the citric acid or lime juice is continued; but subsequently, in the form now directed, or with astringents, tonics, and warm spices, when the disease seems disposed to assume a chronic form, they are often beneficial, assisted by warm clothing, suitable diet, and the occasional exhibition of mild purgatives, so as to prevent the injurious retention of morbid matters, and promote the digestive and secreting actions. In the early stage of convalescence, a similar treatment, with vegetable tonics; and the exhibition of these with aperients, when the bowels become sluggish; should be persisted in. The daily use, for some time, of either of the balsams, according to the peculiarities of the case, combined with a sufficient quantity of magnesia to form a pilular mass, will more effectually restore the tone of the digestive mucous surface, and keep the bowels open, than any other means. Removal to a dry, pure, and warm air will accelerate and establish recovery.

97. (*d*) Dysentery is less frequently *complicated with worms*, in this country, than, perhaps, in any other. Worms are either so extremely common in the inhabitants of low and moist localities, and still more so in the dark races, especially among those who have not a sufficient supply of salt as a condiment; or they predispose so remarkably to the disease — or rather, the state of the digestive organs that favours their generation disposes to it; that a very large proportion of dysenteric cases in the former, and nearly all in the latter, are thus complicated. The judicious use of anthelmintics — the decoction of the bark of the pomegranate root; the male fern, &c., followed by castor oil; and especially the terebinthinated draught and enema already recommended (§ 90.), — will generally remove the disorder. When it has arisen from the want of salt, this substance in sufficient quantity, with warm spices, vegetable tonics, and subsequently chalybeate preparations, will soon have a decided effect; but, without salt, other means cannot be depended upon. This complication is not infrequent in *children*; the above remedies, or such as are most appropriate of those mentioned in the article Worms, being also suitable to them; but when the disease is removed, a course of chalybeates and change of air should be prescribed.

98. (*e*) The *hæmorrhoidal complication* is most speedily relieved by local bleeding from the sacrum or perinæum, followed by fomentations; the hip-bath; full doses of Dover's powder, especially at bedtime; opiated, or opium and litharge, suppositories; and by the supertartrate of potash, with nitre and confection of senna, when an aperient is required. Cooling diaphoretics, and various refrigerants in mucilaginous or emollient vehicles, taken by the mouth, and injected *per anum*, in small quantity, are often useful adjuvants. When the disorder is attended by much pain about the anus, a cooling and anodyne ointment, after having recourse to warm fomentations, will often give relief. The extract of *belladonna*, in an ointment of this description, will be most effective, as it subdues the morbid sensibility, and removes the spasm of the sphincter, which aggravates the pain in these cases.

99. (*f*) The *complication with rheumatism* (§ 44.), or *catarrh*, requires the frequent use of the warm bath or semicupium; and full doses of camphor, and ipecacuanha, or Dover's powders, in oleaginous or mucilaginous vehicles; or antimonial diaphoretics with opium, if there be much febrile excitement and heat of skin. If the symptoms are inflammatory, general or local depletions, or both, should precede the exhibition of these; and, if the biliary secretion be either obstructed or vitiated, a full dose of calomel, or of the milder mercurials, should be given, and be followed by a gentle purgative, and that by an aperient and emollient enema. When the disordered secretions are evacuated, warm diaphoretics, especially camphor with opium; small anodyne injections; opium suppositories, and the constant use of flannel next the skin; will remove the disorder. When severe rheumatic pains are felt in the lower extremities, opiate suppositories, after morbid matters are evacuated, will give great relief. In some instances, the pains in this situation depend upon the retention of fæcal or hardened substances in the cæcum, or about the sigmoid flexure of the colon. In this case, fulness or hardness will be felt in these regions, on a careful examination of the abdomen; and appropriate

purgatives, aided by laxative clysters, will be required, and should be repeated until the collection is evacuated.

100. ii. TREATMENT OF THE SUB-ACUTE AND CHRONIC FORMS. — *A. Of the more simple states.* — The *intentions of cure* by which we are guided in the acute, should, with little modification, be entertained in the chronic, forms. When the symptoms continuing after an acute attack consist chiefly of either frequent or copious evacuations, without tormina or straining, the appetite, pulse, and strength improving, or remaining unimpaired, astringents or opiates should not be prescribed; for the discharges are the means of bringing about a resolution of the inflamed and tumefied viscera. In such cases, the stools are usually of a good colour, and are feculent and fluid. But, if the motions be attended by abdominal soreness, increased on pressure; or by a sense of heat; or by griping, tormina, or tenesmus; if they be slimy, or sanguineous; and if the patient complain of thirst, with fever and restlessness at night; nature requires the judicious assistance of art. Here vascular depletion, most frequently local, although it may have already been practised, and more especially if it have not been resorted to, is required to an extent which the constitutional symptoms will indicate. If, however, the strength is too far sunk, or the asthenic characters are too prominent to admit of this measure, the warm epithem already described (§ 89.), or blisters to the abdomen, followed by a succession of poultices, and these by the warm bath, a thick flannel bandage around the abdomen, and stimulating frictions of the surface, and of the lower limbs, will sometimes be serviceable.

101. In all cases, the state of the biliary secretion and of the liver should be carefully examined. If the investigation furnish no proof of acute disease, or of abscess of this viscus, and if the bile be scanty or altogether obstructed, camphorated mercurial frictions on the hypochondrium, blue pill or hydrargyrum cum cretâ, with ipecacuanha or DOVER's powder at bedtime, and a mild purgative, such as cream of tartar, with confection of senna and extract of taraxacum in the form of electuary, in the morning, will often increase and improve the bile. If mercurials have not been previously used, and if no tenderness or soreness be felt in the region of the liver, nor oppression of breathing, dry cough, nor recurring chills or horripilations alternating with hectic flushings, &c., one or two full doses of calomel, with or without opium, may precede these medicines; the operation of which may be assisted, and the state of the large bowels improved, by emollient and oleaginous injections. After these means have been tried without benefit, the emplastrum ammoniaci cum hydrargyro may be placed over the abdomen; and one or two grains of hydrarg. cum cretâ, or of blue pill, with one of ipecacuanha, and as much camphor, taken thrice daily, with a draught containing a drachm of the extract of taraxacum, or consisting of the decoction of the recent root. As long as the stools are deficient in bile, astringent tonics will seldom prove permanently serviceable; but if the above medicines run off too rapidly in the stools, the compound tincture of opium should be added to them.

102. When the foregoing means have failed, nitric acid with opium or laudanum; and the application of the *nitro-muriatic acid* lotion over the hypochondria and abdomen; may be tried; or, instead of the nitric, the nitro-muriatic acid may be taken internally, in a very weak state of solution, or employed as an enema, with the laudanum, F. 729. Enemata consisting of a weak infusion of ipecacuanha, or of the decoctum lini, with mucilage, or of both, may be administered once or twice a day, while the acids are taken. If these fail, and if the debility be great, the *chlorates*, especially those of potassa or lime, may be given by the mouth, or in clysters.

103. In the advanced stages, the infusion of cinchona, of cinchona and rhubarb, either with or without laudanum, or of catechu with aromatics and warm spices, are generally requisite, more especially in the dark races; the same preparations being also advantageously administered as enemata, either with or without mucilaginous substances. When the disease, like a gleety discharge, proceeds from relaxation of the internal surface of the large bowels, and a habit of increased secretion, these means will prove of essential service. In many cases, the disorder is kept up either by too great indulgence in food, or by the use of stimulating liquors. The diet should, therefore, be restricted; and the digestion of what is taken promoted either by the above medicines, or by the sulphate of quinine or the sulphate of zinc in the form of pill, with inspissated ox-gall, or other medicines suited to the case. If we succeed in controlling the increased action of the bowels, an opposite state should be carefully guarded against, by the occasional exhibition of the means directed above (§ 83.); or of the draught and enema already mentioned (§ 90.). Inattention to this precaution, and errors in diet and regimen, are frequently productive of relapses.

104. If diarrhœa continue after the acute symptoms longer than seems sufficient for the resolution of inflammatory action in the large bowels, and of congestion of the portal vessels, we may suspect that the quantity or kind of aliment is such as the digestive organs, and the biliary and other secretions, are incapable of changing into healthy chyle, — a large proportion of it entering into such acid or acrid combinations as its constituents dispose it to form. In these cases, the stools are frothy, have a sour odour, or are lienteric; and tonics, with mild mercurials and antacids; the sulphate of quinine, as above recommended; the balsams with magnesia, and the liquor potassæ, or the sub-carbonate of ammonia, with tonic infusions, aromatics, and small doses of SYDENHAM's laudanum (F. 729.); are required; whilst the abdomen and hypochondria are sponged with the nitro-muriatic solution; and the large bowels fortified by the tonic and mucilaginous injections already mentioned.

105. In the cases denominated "*White flux,*" from the muco-purulent and gleety appearance of the discharge from the muciparous glands, and the absence of bile, a similar treatment to the above is required; with an occasional dose of calomel, or frequent and small doses of the mildest mercurials, as above directed (§ 101.) The infusion of either cusparia, catechu, simarouba, calumba, rhubarb, cinnamon, &c., with vinum ipecacuanhæ, aromatics, absorbents, and astringents, according to circumstances; the chlorates, or nitre with soda and emollients, in aro-

matic vehicles, and in clysters; assafœtida, with camphor and mucilage, in enemata; and the daily use of the salt-water warm bath, followed by frictions of the surface with a rubefacient and deobstruent liniment (F. 311.), and a flannel roller around the abdomen; may also be resorted to.

106. If the evacuations indicate *ulceration* (§ [illegible]4.) —which, indeed, is seldom altogether wanting in protracted cases—the above treatment, or mucilaginous mixtures with either of the balsams; emollient clysters, and the repeated applications of large blisters, or rubefacients, to the abdomen, or the insertion of setons, are chiefly to be relied on, with the other means advised in the treatment of Diarrhœa (§ 32.), arising from this pathological state.

107. A form of chronic dysentery depends upon, or is kept up by, *ulceration*, or even by a single large ulcer, *in the rectum*, with or without *prolapsus ani* (§ 47.), the abdominal symptoms being slight, but the tenesmus constant and painful. For it, small injections of a solution of the sulphate of zinc, or nitrate of silver, or dilute nitric acid with opium, or superacetate of lead, with pyroligneous acid and laudanum; or of paregoric elixir with mucilage; or of simple camphor mixture; the balsams, or sulphur with cream of tartar, and tonics with deobstruents, being taken internally, and a gently open state of the bowels preserved; will remove the disorder. In nearly all the more simple states of chronic dysentery, also, the same treatment may be appropriately employed as is recommended in the chronic states of diarrhœa, lientery, &c. (See Diarrhœa, § 29—33. and § 41. *et seq.*)

108. *B. The complications of chronic dysentery* are much more common than the simple states; and the most frequent are those with chronic affections of the liver, with disease of the mesenteric glands, and with enlargement of the pancreas and spleen.—(*a*) If the *liver* be free from acute disease of its substance, or from purulent formations (see Liver — *Inflam. and Suppurat. of*), mercurials are often essentially requisite. But, even in such cases, they have been much too liberally employed, on the supposition that salivation is indispensable to the cure of this complication. Where, however, these forms of hepatic disease exist, they should almost altogether be proscribed; and also, where the powers of the system are much reduced, even in the simple states of the disease, the extension of inflammatory irritation to the mesenteric and portal veins, or the absorption of morbid matters from the bowels (§ 77.), and consequent disease — especially purulent collections — in the liver, may be favoured or induced by prescribing them so as to produce their specific effects.

109. (*a*) We often have little or no proof of the presence of chronic change in the liver, beyond the torpid state of its functions already noticed (§ 48.), viewed in connection with the habits of the patient, and the history of his former complaints, and of his present attack; but, in these, mild mercurials, in frequent and small quantities, in conjunction with alteratives and deobstruents (§ 101.), especially minute quantities of antimony, with ammoniacum, soap, and opium; or these with taraxacum in full doses; or this latter with the infusion of calumba; will be found the safest as well as the most efficacious remedies, particularly when assisted by a camphorated mercurial ointment or liniment applied over the hypochondria; or by the nitro-muriatic acid solution, employed either as a wash, a lotion, or on the surface of warm poultices; or by repeated blisters; or by issues or setons, and the ammoniacal and mercurial plaster over the abdomen, or a combination of it with other deobstruent and warm plasters. In these cases, we must be guided by the evidence we may have of change of the liver, and direct our treatment to its removal, conformably with the views stated in the article on the diseases of that viscus. When the stools are frothy, and deficient in bile, the hydrargyrum cum cretâ, or the blue pill, will be advantageously combined with inspissated ox-gall, extract of taraxacum, and small doses of Dover's powder, or opium. The sub-carbonates of the alkalies, or borax, may also be given with vegetable tonics, ipecacuanha, and the preparations of hop; either of the liniments, (F. 296. 311.), alone, or with the mercurial liniment, being daily rubbed upon the abdomen, or applied by means of a piece of flannel moistened with it and placed under wash-leather,—which will protect the clothes from it, and prevent its evaporation. In the foregoing states of hepatic complication, change of air, horse exercise, or travelling, and a regulated diet and regimen, will materially assist the treatment.

110. *β*. A sub-acute, slight, or chronic form of dysentery is sometimes merely *symptomatic* of the advanced states of hepatic abscess, and occurs more frequently than the very acute complication alluded to above (§ 94.). It requires either a similar treatment to that now stated, or simply support of the powers of life, in order to enable them to overcome the disease. The arrest of the discharges in this state of the complaint frequently increases the hepatic malady, or occasions severe constitutional disturbance. Gentle tonics and restoratives, light or farinaceous food, and such astringents, anodynes, and emollients as will merely control and sooth the bowel affection, until the above treatment, or that recommended for *suppuration of the* Liver, shall remove the principal or primary disease, are the most deserving of confidence.

111. *γ*. When *purulent matter collects in the liver, in an advanced stage of dysentery*, the occurrence can be explained only as attempted above (§ 77.); and, during the life of the patient, the symptoms will seldom warrant more than a supposition of its having taken place. The facts, that a bad habit of body, and an asthenic state of the powers of life, are the chief causes of the absorption into the blood of morbid matters from the seat of disease, and of the extension of inflammation from an ulcerated part along the veins; and that these changes induce those observed in the liver in such cases, should be kept in view in the treatment of the advanced stages of dysentery,—particularly as it has been satisfactorily shown that a large proportion of unfavourable cases terminates fatally, owing to the contamination of the circulating fluid produced in this manner, either with or without the concomitant lesions of the liver, of which particular notice has been taken. Conformably, therefore, with these facts, the remedies I have shown, in the article Veins, to be most efficacious in arresting the extension of inflammation along them, in preventing or counteracting the contamination of the blood, and in supporting the vital

powers, will be most beneficial, not only where this complicated state is inferred, but also in an advanced stage of the malady, and especially in its asthenic forms, where it is most desirable to prevent or arrest these very dangerous occurrences. When the disease is *symptomatic* of the absorption of morbid matter from carious bones, foul ulcers, &c. (72. *c*), the principles and treatment now stated should be adhered to, and the chlorurets applied to the ulcerated parts.

112. (*b*) The complication with *disease of the mesenteric glands* frequently cannot be distinguished from that with chronic change in the liver; but, when the stools are lienteric, and the abdomen hard and tumid, the former association may be inferred, although the hepatic complication may also be present; the means now recommended being equally appropriate to both. I have seen benefit derived, in some cases of the mesenteric complication, occurring in *children*, from *liquor potassæ*, or BRANDISH's *alkaline solution*, in tonic infusions, with syrupus papaveris or tinctura opii; and from the chlorate of potassa with DOVER's powder, a terebinthinate draught and enema being administered every third or fourth day. More recently, the ioduretted solution of the *hydriodate of potash*, with very small doses of laudanum, or the *ioduret of mercury* in minute quantities, has also been prescribed with advantage, especially when assisted by the warm bath, and some one of the liniments or other external applications enumerated above. If the patient, however, complain of tormina, or if the stools be bloody, the daily application to the abdomen of some one of the ointments containing the preparations of *iodine* (F. 766. *et seq.*) will be preferable to the internal exhibition of this substance. In this class of subjects, change to a dry and pure air, and the prolonged use of these medicines in very small doses, are requisite to success. The same treatment may be also employed in the hepatic complication. But in the acute maladies of the liver, the preparations of iodine are often injurious.

113. (*c*) The *complication with disease of the pancreas* is even more difficult to be ascertained than that with mesenteric enlargement; but, even when confidently inferred, it does not seem to require a different treatment from that now recommended. —In the *splenic association*, nearly similar measures to those already stated are also applicable. The preparations of bark; the sulphate of quinine, and of the metals; and stomachic purgatives; are more especially indicated in it; particularly when aided by emollient clysters, and the external applications described above (§ 109.).

114. (*d*) *Chronic dysentery in the dark races*, being characterised by relaxation of the mucous surface of the large bowels, and an adynamic state of the system, and differing not materially from chronic diarrhœa, will be most successfully treated by tonics conjoined with astringents, absorbents, aromatics, and hot spices; by the warm bath; by injections with lime water and other astringents; and occasional stomachic or warm purgatives, in order to prevent fæcal matters from collecting. Its principal *complications*, in these races, are with *enlargement of the spleen*, *with worms*, and *with mesenteric disease*; the two latter especially. In the association with enlargement of the spleen, the sulphate of iron or other chalybeates, with rhubarb, and occasionally stomachic purgatives, are the most efficacious medicines. To the other complications, the treatment already prescribed (§ 97. 112.) is also appropriate. (See also DIARRHŒA — *Treatment of, in the Dark Races*, § 37.)

115. iii. TREATMENT OF CERTAIN STATES AND CONTINGENT CHANGES. — *A*. When dysentery is prevalent, a recognition of the *early symptoms*, particularly those *premonitory* of an attack, as sunk pale countenance, griping pains with borborygmi, and irregular chills or horripilations, with or without diarrhœa or tenesmus, should lead to the adoption of means which will often ward off the disease or cut it short. Of these, the most efficacious is an ipecacuanha *emetic*; which may even be repeated until its free operation is procured, followed by a single full dose of calomel; and that, in two or three hours, by a purging draught, and a laxative enema. After these, a warm bath, the patient being well rubbed upon coming out of it, and placed between warm blankets; and pills with camphor, ipecacuanha, and three or four grains of opium, repeated subsequently in smaller doses; will frequently remove all disorder. This plan, if employed sufficiently early, is equally applicable to all the varieties of the disease.

116. *B*. (*a*) Extreme *irritability*, *want of sleep*, and distress at night, during the most acute attacks, often exhaust the strength of the patient, and require either very large doses of opium, or opiate suppositories, or small opiate injections, especially after coming out of a tepid or warm bath — a tepid bath if there be much heat of skin or attendant sthenic diathesis, and a warm bath if the constitutional affection be of the asthenic kind. — (*b*) Excessive *irritation in the rectum*, and *dysuria*, may be alleviated by the treatment directed above (§ 84, 85.), and by small injections — from three to five ounces — containing either opium, or the extract of hyoscyamus, or the extract of belladonna, or F. 137.; recollecting, however, that this latter will often produce much disorder, if too freely employed. In a case where I prescribed it, in 1826, with remarkable benefit, it affected the head, and caused a most copious scarlet eruption on the skin. — (*c*) Very copious *effusions of blood* alarm the patient; and although they frequently relieve the sthenic forms, yet, if often repeated, or occurring too largely in the asthenic varieties, they require to be moderated, or arrested. In the former states, general or local depletions will be the best means of removing them; but in the latter, or when they sink the vital energy, the terebinthinated draught and injection prescribed above (§ 90.), or the superacetate of lead, in draughts with acetic acid and laudanum, or in enemata; or the muriated tincture of iron in the infusion of quassia, by the mouth, or in clysters; or lime juice and opium, similarly prescribed; will generally prevent further discharge. — (*d*) Distressing *flatulence* and *meteorismus* will often be relieved, especially in the adynamic states, by a terebinthinated or an assafœtida injection (F. 136.), and by the warm epithem; or by the infusion of the leaves of rue, employed as fomentations over the abdomen; or by the bruised macerated leaves applied warm to the same situation. — (*e*) *Leipothymia* or *sinking*, or even full *syncope*, may follow the efforts at evacuation — particularly if the

patient get up to the night-stool, at an advanced, or in an adynamic state of the disease; and death may even take place from this circumstance, especially in the scorbutic complication, or when the patient has been kept too low, or has been addicted to spirituous liquors. Restoratives, the supine posture, and the use of the bed-pan, should not be neglected in these cases.

117. *C.* (*a*) *Prolapsus ani* indicates severe irritation about the sigmoid flexure of the colon, and upper part of the rectum, and requires the careful replacement of the part, local depletions from the sacrum, astringent fomentations with opium to the anus, astringent lotions, and injections with an urethra syringe, especially if the rectum be ulcerated; small injections of the dilute black wash, if sloughing of the bowel be suspected; and the belladonna plaster over the sacrum, or above the pubis, in order to remove the spasm of the muscular coats of the intestine. When this symptom occurs in chronic dysentery, we may infer the existence of ulceration. In such cases, injections of a solution of nitrate of silver will give permanent relief. — (*b*) *Excoriations about the anus* often occur, in all the forms of the disease, but most frequently in the hepatic complication, and require warm anodyne fomentations and poultices; small narcotic injections; and ointments with opium and mineral astringents, as the sulphate of zinc or the acetate of lead. — (*c*) *Abscess in the vicinity of the anus* should be treated at first by local depletions and cooling discutient applications; and if these fail, by warm poultices, and early external openings, in order to prevent internal fistula. If the suppurating part assume an unhealthy aspect, injections with the dilute disinfecting fluid, and a tonic constitutional treatment, should be adopted. — (*d*) *Ulceration in the bowels*, of a sloughing kind (§ 54.), is a very unfavourable occurrence in the *acute forms*, for which a tonic and an emollient treatment — the internal use of the chlorates with opiates, and mucilages, clysters of the same description, and the other measures directed for the malignant variety (§ 89.) — should be employed. — The ulceration that takes place in the progress of the *chronic form* ought to be treated by the remedies recommended for the obstinate states of that form (§ 105, 106.).

118. iv. OF CERTAIN CONSEQUENCES OF ACUTE AND CHRONIC DYSENTERY. — *A.* (*a*) In the acute varieties, and occasionally in the chronic, the *extension of inflammation*, with or without previous ulceration, from the internal *to the external surface of the bowels*, or to the *omentum*, or *mesentery*, is one of the most dangerous results; and requires very decided treatment, as soon as the symptoms of this change (§ 55.) appear. General or local depletion, if the state of the circulation and of the constitutional affection permit either or both, should be practised; a full dose of calomel, camphor, and opium being exhibited immediately afterwards. These may be followed in a few hours by the terebinthinated draught, or enema, or by both; but more especially by the warm turpentine epithem (§ 89.), which ought to be repeated until the peritoneal inflammation is subdued. Nothing short of these means, promptly practised, will, in such cases, save the patient; but these will sometimes be successful, if properly employed, and not left to ignorant or careless persons. — (*b*) *Adhesions* of various parts of the serous surfaces sometimes remain after these attacks; as shown upon dissection of cases that have been carried off a long time subsequently by other diseases. The signs of this *sequela* are very obscure and uncertain. But I believe, that these adhesions will gradually diminish, and ultimately almost disappear, if we succeed in restoring the natural functions to a healthy state; all adventitious productions being removed by a due manifestation of the vital energies in the assimilating and absorbing organs; and by derivation to, and counter-irritation in, distant parts. Either with, or without, the effusion of lymph necessary to these adhesions, a copious *effusion of serum into the peritoneal cavity* may take place, the dysenteric affection being suppressed, or very rarely persisting. This occurrence is most frequent when there is coexistent disease of the liver, or when the dysentery has followed fevers. The treatment, in such cases, must be much the same as that directed in DROPSY *of the Abdomen.* The application to the abdominal surface, twice daily, of about a drachm of an ointment consisting of from six to twelve grains of *veratria* to an ounce of prepared lard, as first recommended by M. MAGENDIE, and very recently adopted in this country, promises to be extremely beneficial, as being more especially appropriate, in dropsy occurring in these circumstances.

119. *B. Contractions or strictures of the colon* are among the most unfavourable changes, attending the advanced stages of the chronic disease, or remaining as its *sequela*. It is important, in respect both of the diagnosis and treatment, to form some idea, although we cannot often be certain, of their existence during life. Yet I have seen the diagnosis fully established, in some instances, by rational inferences from the phenomena of the case. The use of bougies, for the purposes of diagnosis or cure, is entirely out of the question: the legitimate exercise of medical science is here only required. If there be great difficulty or impossibility of procuring full or feculent stools, the patient not complaining of tenesmus or the acute symptoms of dysentery; if the evacuations be scanty, or contain semi-dissolved fæces, with shreds of white mucus or of albuminous exudation, and if they be preceded by an uneasy sensation in the course of the colon, with that of load or fulness about the cæcum and right hypochondrium, or between the epigastrium and umbilicus; if there be distension of the abdomen, with flatulent eructations and a foul or feculent odour of the breath; if an injection cannot be fully thrown up, or if it return immediately, or before the last part is thrown up, although the pipe is fully introduced and carefully guarded; and particularly if these symptoms occur in an advanced stage of the chronic disease, or in persons who have had previous attacks; then stricture in the left and sigmoid flexures, or even in the transverse arch, should be dreaded. In such cases, the patient will occasionally complain of a sense of tearing, scraping, gnawing, or of dragging in some part of the colon, previously to the operation of the bowels; the regions of the cæcum and ascending colon being hard and tumefied.

120. The chief objects in these cases are to preserve the contents of the large bowels in a

fluid state, and prevent thereby the accumulation of fæcal matters above the stricture, and the consequent irritation and distension; endeavouring, at the same time, to subdue the chronic inflammation and ulceration frequently existing in the strictured part. These intentions are to be fulfilled by gentle and cooling laxatives; by refrigerants with anodynes and emollients, and by injections of a similar kind, slowly and carefully thrown up by the improved apparatus. Gentle friction, also, of the abdomen, with oleaginous or antispasmodic liniments, following the exhibition of these medicines, will also be serviceable. As to the particular remedies that may be employed, the supertart. of potash with borax, or with magnesia; soda tartarizata; manna; olive oil, or oil of almonds, either alone, or with sweet castor oil; ipecacuanha with soap, small doses of blue pill or hydrarg. cum cretâ, and extract of hyoscyamus or of conium; the nitrate of potash with subcarbonate of soda and small doses of camphor; the confection of senna with sulphur, and cream of tartar; the decoctum lini in enemata with olive oil, or with borax; the common soap injection; the emplastrum ammoniaci cum hydrarg. either alone, or with extract of belladonna, placed on the abdomen; or the linimentum hydrargyri, with the linimentum saponis cum opio, and the linimentum camphoræ compositum, rubbed assiduously on this part; or external irritation of it by F. 311., or by citron oil; and a regulated farinaceous diet; have appeared to me the most successful remedies. Aloetic, saline, resinous, or irritating cathartics are obviously injurious. During this treatment, febrile excitement of the system should be guarded against, and removed by cooling diaphoretics. The occurrence of *stricture in the rectum*, as a sequela of chronic dysentery, is not infrequent, and should be treated upon the same principles and in the manner explained in the article RECTUM.

121. v. NOTICES OF METHODS OF CURE AND REMEDIES RECOMMENDED BY WRITERS. — In the treatment of no other disease, perhaps, has the baneful influence of exclusive medical doctrine been more fully exerted than in that of dysentery. This is fully evinced by the much less rational measures very generally employed, towards the end of the last century and at the commencement of this, wherever the theory of BROWN was adopted. — *A. Vascular depletions* have been directed in dysentery from the earlier periods of medical history. They were recommended by AETIUS, ALEXANDER, and RHAZES; and by GORION (*Ergo Dys. Phlebotomia.* Paris, 1604.), RIVERIUS, PROSPER ALPINUS, LESPICIER, BOTALLUS, SYDENHAM, ELLAIN, ZACUTUS, and many other writers of the sixteenth and seventeenth centuries; but had fallen into disuse, when Dr. JACKSON and Dr. WHYTE (*Med. and Phys. Journ.* vol. ii. p. 283.) revived the practice. During the Peninsular campaigns, general and local bleeding were freely employed by Drs. SOMERS, FERGUSON, FORBES, and other physicians of the British army. Indeed, it had never been altogether neglected by judicious practitioners during the last century, notwithstanding the injurious influence of theory upon medical observation and practice; for we find it directed by HILLARY, AKENSIDE, CLEGHORN, PRINGLE, BAKER, STOLL, M'GRIGOR, &c., and strenuously contended for by JUNCKER (*De Util. Venæsect. in Dys.* Hal. 1770.) in the early stages of the inflammatory disease. From what has been stated above, it is apparent that bloodletting, although applicable to certain forms of dysentery, should be employed with much discrimination, and with due reference to the exciting causes, and to the prevailing epidemic constitution. This is well illustrated by its injurious effects in the asthenic forms; especially those proceeding from depressing causes and contaminating sources; and by the history of dysenteric epidemics (§ 29.). Mr. BACOT states that, when the malady was consequent upon fever, in the Peninsula, or arose from the same exciting causes, bleeding could seldom be borne. It would also appear, that from 1817 to 1827, during which period the seasons were tolerably regular and the summers dry and warm, this disease was attended by more or less of the inflammatory diathesis; and that, from this latter date, when they became less regular and much more wet and cold, it has assumed more of the asthenic characters. The application of *leeches* to the anus, advised by NEUMANN, HUNNIUS, and many French writers, is often productive of benefit; but irritable sores, owing to the excretions coming in contact with the bites, are apt to follow.

122. *B. Evacuants.* — (*a*) *Emetics* are extolled by some writers, and considered injurious by others. The circumstances in which they may be employed (§ 92. 115.) have already been pointed out. They are certainly more beneficial in some seasons and epidemics than in others; as, indeed, admitted by CHOMEL (*Ergo Dysent. Vomitus.* Paris, 1698.), FISCHER, GOEDEN, MICHAËLIS, and SCHMIDT (*De Emet. Usu in Dysent.* Jenæ, 1803.), and HUNNIUS (HORN'S *Archiv.* 1811. p. 151.), who are amongst the most strenuous believers in their efficacy. HIPPOCRATES directs early recourse to be had to them. CLEGHORN advises them in the bilious form: WENDELSTADT in the same variety, or when the disease is complicated with rheumatism; and he prescribes diaphoretics and opium after their operation. STOLL very justly considers them most appropriate where there are little fever, and no constant pain or tenderness in the abdomen. In these cases, they generally promote diaphoresis, especially if opiates be given soon afterwards. As to the choice of emetics, some difference exists. Antimonials are preferred by PRINGLE (*Edin. Med. Essays*, vol. v. art. 15.), BAKER, ADAIR, and SAUNDERS; and ipecacuanha by HARGENS, WEBER, ANNESLEY, and the great majority of the most recent writers. Dr. WRIGHT found ipecacuanha emetics, followed in succession by cream of tartar and castor oil; afterwards by DOVER'S powder, as soon as the digestive tube was evacuated; and, lastly, by cinchona or cascarilla; the most successful method in West Indian dysentery.

123. (*b*) *Purgatives*, generally of a mild description, are directed by DU BREVIL, J. HUNTER, LOMBARD, MÜLLER, and HESSE (*De Usu Evacuantium in Dys.* Jenæ, 1800.). SYDENHAM prescribes those of an active kind, after bleeding and a full dose of laudanum. JACKSON and ANNESLEY adopt a nearly similar practice. HUNNIUS and WENDELSTADT prefer laxatives, or mild and cooling purgatives, and consider them most serviceable in the bilious variety; whilst LIND,

Vogel, Thomann, Weber, and Neumann believe all purgatives injurious, and advise only the gentlest *oleaginous laxatives*. The circumstances in which these medicines are most appropriate will be apparent from what has been stated above; as well as those which should be selected. *Calomel* is preferred by Jackson, Ballingall, Bampfield, and Annesley, when assisted in its purgative operation by other medicines, either combined with it, or given subsequently. *Sulphur* is recommended as a laxative by Wedekind and Lange (*Miscel. Verit.* p. 30.); and certainly full doses of the precipitated sulphur, with one or two drachms of cream of tartar; or these with confect. sennæ, in the form of electuary, are amongst the gentlest and most certain aperients that can be exhibited, in an advanced stage of the acute, or in the chronic disease; and may be given every two or three hours, until the effect is produced. The *neutral salts* are, in general, not so serviceable as the laxative oils, although Clarke, Balmain, and Mursinna are favourable to the use of the sulphate of soda. Stoll recommends the saline aperients only in the bilious variety; and anodynes after their opertion; and several writers extol them when conjoined with antimonials. The supertartrate and tartrate of potash, or the soda tartarizata, are, upon the whole, the most serviceable of this class of purgatives. The *supertartrate of potash*, finely levigated, and given to the extent of three or four drachms every six hours, in the form of electuary, with the pulp of tamarinds and syrup of ginger, will often open the bowels and procure the excretion of bile, when other means fail. The practice is recommended by Selle (*De Curandis Morbis, &c.* p. 157.), and was found to succeed in some hopeless cases by Dr. Cheyne. It is the more efficacious after the exhibition of mercurials; and, when the substance of the liver is acutely affected, may be depended upon as an appropriate refrigerant purgative. But, in ordinary circumstances, there can be no doubt of the propriety of the decision of Cullen, Bang, Tode, Clark, and Piderit, in favour of oleaginous laxatives given by the mouth, and in mucilaginous enemata. When we suspect, from the existence of scybala, or the appearance of the stools, or from fulness or hardness in the course of the colon, the accumulation of fæcal matters in the cells of this bowel, the oleaginous draught prescribed above (§ 83.) may be exhibited; or the following pills may be given every two hours until a full evacuation is procured.

No. 203. ℞ Scammoniæ, Pulv. Rhei (vel Pulv. Jalap.), āā gr. ij.; Potassæ Sulphatis gr. iv.; tere probe simul, et adde Olei aut Syrupi q. s. ut fiant Pilulæ duæ.

124. (*c*) *Enemata* are amongst the most efficacious means for either the evacuation of morbid matters, or the removal of the diseased action going on in the large bowels, or both. Those with the *laxative* and *emollient oils* are preferred by Celsus, Cullen, Bang, Horn, Rademacher, and some others, when the first intention requires to be fulfilled; and to these substances may be added laudanum or hyoscyamus, according to circumstances. *Amylaceous, emollient,* or *mucilaginous* injections, with or without anodynes, are directed by Hippocrates, Alexander, Paulus, Lind, Schlegel, Duncan, Neumann, Thomann, &c., chiefly with the second of these intentions. Small *acetous* clysters with opium are prescribed by Vander Heyde, Birnstiel, and Brüning; decoction of *linseed* with laudanum, by Celsus, Clark, and Horn; decoction of *quince seeds*, by Wendt; the decoction of the root of *marsh mallows*, by Paulus Ægineta, and Ecker; *milk*, by Celsus, Alexander, and Forestus (lib. xxii. obs. 36.); and milk with theriaca, in the acute varieties, and with Venice turpentine, in the chronic, by Sydenham. Injections, as directed in the foregoing sections, should have strict reference to the state and stage of disease, and not be bulky. Hunnius considers large enemata injurious; they are very seldom long retained. Many substances, besides those now mentioned, may be thus administered; especially in the chronic states. Galen, and the Arabian physicians, exhibited nearly all the vegetable and mineral *astringents*, the *anodynes*, and even the escharotics, as the preparations of *arsenic* and *copper*, in this way. Dr. Jackson advises a weak solution of *corrosive sublimate*, with myrrh, and demulcents; and Mr. Annesley, the black or yellow wash, to be thrown up in enemata, in the chronic complaint.

125. *C. Emollients and Demulcents* are beneficial, not only in themselves, prescribed in the form of draught or injection, but also as the vehicles of more active substances. They constitute one of the chief means employed by Hippocrates in dysentery. Several *oils* are exhibited in this manner, either in the state of *emulsion*, or on the surface of other fluids. *Linseed oil* is preferred by Ruland (*Curat. Erup.* c. iv. n. 40.); *almond oil*, by Heuermann; and *sweet oil*, by numerous writers. This last, in sufficiently large quantity, is one of the most efficacious remedies that can be administered as an enema. *Mucilages*, prepared chiefly from the gums, either alone (Gilibert, *Advers. Pract. Prim.* p. 417.); or with absorbents and opium (Pfenninger and Staub); the *decoctions* of marsh mallows or of the common mallow (Paulus, Kortum, Ecker), drunk warm, in large quantity; saleb (Weber and Hargens); and the decoction of the Carageen moss, or of Iceland moss (Hargens, l. c. and Herz, *Briefe*, b. ii. n. 2.); are useful medicines.

126. *D. Anodynes*, especially after vascular depletions where they are required, and alvine evacuations, are very generally recommended. —(*a*) *Opium* is the most to be depended on, and the most generally appropriate in some combination or other, according to the intentions to be fulfilled. If its sedative effect chiefly be desired, and if inflammatory fever be present, it may be given in doses of from one to four grains, either alone, or with nitre, or with antimonials, as directed by Blane, Himly, Jawandt, Cheyne, Neumann, and Horn (*Archiv.* b. vi. p. 103. *et seq.*). When it is desirable to procure a diaphoretic operation, it is best conjoined with ipecacuanha (Cardin, Müller, &c.), or small doses of camphor and nitre; or in the state of laudanum, with considerable quantity of the spiritus ætheris nitrici, or with other diaphoretics (Hinze, Jackson, &c.), especially in the asthenic forms. If the biliary secretion be scanty, the liver not being actively diseased; or if the intention be to excite salivation; opium may be conjoined with moderate doses of calomel, and given every four or

ix hours, as directed by J. JOHNSON, LEIDENFROST, RENTON, and others — particularly in the sub-acute and chronic states. If the powers of life be depressed, and the circulating and secreted fluid vitiated, it will be necessary to exhibit it with tonics and antiseptics (MORTON, WEDEKIND, &c.), as cinchona, the chlorates, &c.; and with astringents (RIEDLIN), when the evacuations are profuse, the digestive mucous surface relaxed, or the disease chronic. CONSBRUCK considers opiates injurious, unless preceded by emetics; and SYDENHAM, MURSINNA, and others, either premise evacuations, or alternate them with anodynes. The opinion of WENDELSTADT, that opium, as well as astringents, are injurious in the bilious variety, until morbid secretions are evacuated, is judicious, and may be extended to most forms of the disease. In the nervous or typhoid variety, they should be given with great circumspection. MORTON found that, when mainly depended on, in the epidemic of 1666, they augmented the exhaustion and muttering delirium frequently attending it. Opium, in *suppositories* (BATEMAN, &c.), and in *liniments* rubbed on the abdomen, or externally in other forms (HARGENS and THOMANN), has been already recommended in various states of the malady.

127. (*b*) Amongst those substances which act most energetically in removing spasm of the intestinal fibres, and diminishing morbid sensibility, hyoscyamus, belladonna, and tobacco, are the most deserving of notice. *Hyoscyamus* is recommended by MATTHÆI, WITHERING, and HUNNIUS; and, in the acute and febrile states of the disease, may be exhibited in the same manner and forms of combination as opium. The recent juice of *belladonna* is praised by GESNER (HALLER's *Biblioth. Med. Pract.* vol. ii. p. 55.), and ZIEGLER (*Beobachtung.* p. 35.); but the powder of the root, and the extract of this plant, are equally efficacious when properly preserved. A strong infusion of *tobacco* is prescribed as a fomentation to the abdomen, by Drs. GRAVES and O'BEIRNE. These narcotics are appropriate only to the early stages of the sthenic states of the disease, and require much discrimination and caution. The *prussic acid*, with camphor, ipecacuanha, and mucilages, is of benefit when judiciously prescribed.

128. *E. Diaphoretics* are extremely beneficial in the early stages of the disease. Those of a cooling and relaxing kind are most suitable to the sthenic forms, and such as are warm and exciting in the adynamic states. — (*a*) *Antimonials* are preferred by PRINGLE, SIMS, FISCHER, BAKER, VOGEL, ADAIR, RICHTER, and HUFELAND; whilst HEUERMANN (*Bemerk.* b. i. p. 184.) considers them injurious, — an inference, which I believe to be correct as respects their exhibition in the advanced stages, or in the asthenic states. Of these preparations, the most serviceable is JAMES's powder, given with calomel, or with calomel and opium in the first stage. *Liquor ammoniæ acetatis*, with mucilages, emollients, and opiates (HARGENS); or with small doses of *camphor* and nitre, and either with (RICHTER and SAUNDERS) or without anodynes, is more generally appropriate; and, in persons who have been addicted to spirituous liquors, or in the asthenic forms, with camphor mixture, the spiritus ammoniæ aromaticus, or the *spiritus ætheris nitrici* and laudanum, is very beneficial. The infusions of *serpentaria* or of *arnica*, either alone, or with liquor ammoniæ acetatis, or with camphor and opium, are indicated chiefly in the malignant or nervous varieties, or in the advanced stages of the other asthenic forms. The infusion or powder of the root of *arnica* (MICHAËLIS, COLLIN, BIRNSTIEL, and FISCHER), may be employed in similar combinations and states of the disease, as advised by RICHTER. STOLL (*Rat. Med.* vol. ii. p. 421.) recommends it after emetics, depletions, and evacuants, in the acute; and in the chronic complaint. *Ipecacuanha* is, however, the most certain in its effects, when combined with opium, and the most to be depended upon, in arresting the train of morbid actions. The injunction of Sir G. BLANE, to have recourse to diaphoretics after evacuations have been procured, should not be overlooked. — (*b*) The importance of restoring the functions of the skin has been duly estimated by GRUBER, JACKSON, NEUMANN, VOGLER, and SCHLEGEL, and should not be confided to internal remedies merely. *Tepid* or *slightly warm baths*, in the highly inflammatory states, and *warm baths* (BLANE, HORN, RICHTER, KÖNIG, GOEDEN, &c.), or baths with aromatic and stimulating herbs infused in the water (THOMANN, *Ann. ad* 1800, p. 237.) are also important means. *Vapour baths*, and the application of *dry heat* (HEISTER, VOGLER, and HARGENS,) are also deserving of notice. Frictions of the surface, or, as PROSPER ALPINUS and others advise, frictions with sweet oil, upon removal from the bath to a warm bed; and the internal use of diaphoretic diluents, are useful adjuvants. — (*c*) Warm *poultices* (ANNESLEY and Author) and epithems or *fomentations* frequently applied to the abdomen, as directed by ALEXANDER, RIVERIUS, BRÜNNER, STOLL, RICHTER, &c., are often serviceable, when they are so managed as not to wet the bed-clothes. Warm cataplasms of aromatic and antispasmodic herbs, &c., are praised by HEISTER, BLANCHARD, THOMANN, BRÜNING, KLINGE, (in HUFELAND, *Journ. der Pr. Arzneyk.* b. vi. p. 900.), HINZE, (HORN's *Archiv.* b. iv. p. 516.), GOEDEN (*Ibid. Mart.* 1812, p. 331.), and HORN (*Ibid.* b. vi. p. 263.). These also act as derivatives, as well as diaphoretics.

129. *F. External derivation* is very generally prescribed. MOSELEY and MATTHÆI recommend it chiefly in the complication with rheumatism, for which PAULIZKY (*Beobachtung.* st. ii. n. 1.), directs *blisters* to the thighs; where, also, they are generally ordered to be applied by MÜLLER, ECKER, and AMELUNG. SCHLEGEL, LIND, STOLL, BLANE, FISCHER, MURSINNA, NEUMANN, and ANNESLEY advise large blisters to the abdomen; and HUNNIUS to the sacrum; whilst other writers think that they increase the dysuria. *Sinapisms* are noticed by BLANE and FISCHER; and camphorated *liniments* rubbed on the abdomen, by LIND. These are less rapid in their effects, and much less efficacious, than the turpentine *epithem* described above (§ 89.), or friction with *croton oil*, either of which may be also applied to the insides of the thighs and legs in urgent cases.

130. *G. Astringents* form a principal part of the means employed in dysentery by GALEN and the Arabian physicians. Various substances of this kind are recommended. Dr. WRIGHT advises *citric acid* and common salt, which are often of

much service either with or without opium, especially in the asthenic states, and as they occur in the dark races. Goeden (in Horn's *Archiv.* Mart. 1812, p. 284. and 323.), prescribes *tartaric acid* with refrigerants, and opium; Bang, *sulphuric acid* with mucilage; Annesley, the *nitro-muriatic* acids, with anodynes; and M'Grigor and Hope, *nitric acid* with opium; this last being chiefly appropriate to chronic cases, and those associated with disease of the collatitious viscera. Birnstiel directs *alum* conjoined with camphor; Loos (Horn's *Archiv.* Jan. 1810, p. 193.) alum with *tormentilla root;* Hunnius, Michaëlis (Hufeland, *Journ. der Pr. Arzneyk.* b. vi. p. 280.), and Hargens (*Ibid.* b. vii. p. 137.), alum with mucilages, opium, &c., chiefly in the chronic and atonic states; Moseley and Jackson, alum with sulphate of zinc, by the mouth and injections; and Adair, alum with spermaceti, or gum, opium, and aromatics, in epidemic dysentery occurring among negroes. *Lime water* with milk, or with mucilages, is praised by Grainger, Brefeld, and Lange; but is most serviceable in the chronic and asthenic states, and in the form of enema; in which cases, various other astringents are recommended, especially after morbid matters are evacuated. In this manner the preparations of *catechu* are directed by Brande (Tode's *Med. Journ.* b. x. n. 1.) and others; *kino,* by Weber; *hæmatoxylon* with cinnamon and other aromatics, by Pringle and Wendt; the *tormentilla root,* by Hoffmann; the *lythrum salicaria,* by Quarin and Gardane; the root of the *ledum palustre,* by Biornlund; *betel,* by Peron; the inner bark of the *brucea antidysenterica,* by several writers; and the decoction of the *pomegranate bark,* or of the rind of the fruit, by the ancients, and by many modern authors. All these, especially tormentilla, catechu, and betel, are advantageously combined with ipecacuanha or Dover's powder. Several mineral astringents are also exhibited, especially in the asthenic and chronic states, or in far advanced stages; internally as well as in enemata. *Arsenic,* and the rust of *copper,* are prescribed by Galen, Rhazes, and most of the ancients; and the *sulphates of zinc,* of *copper,* and of *iron;* and the *nitrate of silver,* either with or without opium; by the authorities referred to in the article Diarrhœa (§ 50.). The *superacetate of lead* is recommended by Fernelius, Camerarius, and Nardius, and is now frequently employed, in pills, draughts, or injections, generally with opium and ipecacuanha, both in the acute and chronic forms; particularly the latter. It should be recollected, when prescribing astringents in this disease, that they are injurious when exhibited early in the acute states, and whilst there is much fever, or when morbid matters remain to be evacuated. In other circumstances, they frequently are of much service; particularly when altered secretions and accumulated excretions are discharged from time to time by a judicious exhibition of mild purgatives; and when they are conjoined with demulcents, with ipecacuanha, or with absorbents, or with anodynes, according to the forms of the disease and the state of the patient. Morton found them injurious, although they diminished the discharges; in the malignant or colliquative epidemic of 1666; and similar results have been remarked by others.

131. *H. Tonics* are required in nearly the same states of the disease as astringents; but they are less frequently injurious, as they do not so completely suppress the discharge from the intestinal mucous surface as astringents usually do. They admit, also, of similar combinations with anodynes, demulcents, and absorbents, to those found most serviceable with astringents; and possess the additional advantage of promoting the operation, and, in some instances, counteracting the ill consequences that might result from the exhibition, of purgatives or aperients. In the asthenic forms, they may be exhibited as early as the morbid matters are evacuated, particularly in conjunction with ipecacuanha, or diaphoretics and opiates; and when evacuation should be promoted, they are beneficially associated with laxatives. *Cinchona* is praised by Whytt, Linke, Clark, and Douglas (*De Dysent. Putrida,* ed. 1766, p. 35.). Bang prescribes it with rhubarb (*Act. Reg. Soc. Med. Haun.* vol. i. p. 105.); Schmidtmann, with ipecacuanha; Whytt, Quarin, and Pringle, with catechu and ipecacuanha, after bleeding and alvine evacuation; and Morton with opium. Heuermann restricts it to dysentery following fevers; and Cullen advises it chiefly when the disease assumes an intermitting or remitting character. Huxham and Pringle prescribed an *infusion of it* and *serpentaria,* with great benefit, in the asthenic and malignant states, and during convalescence. Marcus considers the bark injurious; which it doubtless is in the early stage of the inflammatory forms. Most of the other tonics are recommended by authors, and admit of similar forms of exhibition, in the states which require the lighter preparations of bark; for where the infusion or decoction of cinchona, with liquor ammoniæ acetatis, vinum ipecacuanhæ, and anodynes, are of service, the other tonic infusions will also be of use. Indeed, some of them, as the infusion of *calumba* (Percival and Mertens), or of the *cusparia bark* (Brande, *in Hannover Magaz.* b. xxviii. p. 1101.), will be preferable in certain forms of the disease, especially in the combination now stated. In the advanced stages of the acute, or in the chronic and more asthenic forms, where tonics are chiefly required, *simarouba* (Wright, Gooch, Wendt, Quarin, Baumes, Degner, and Sumeire) will be also found an excellent remedy, either alone, or with the medicines just enumerated. Dr. O'Brien found it very serviceable in the advanced stages of the dysentery that was lately epidemic in Ireland, in conjunction with opium. The *willow bark* (Loeffler and Osiander), and *cascarilla* (Weber, and Horn, *Archiv.* July, 1820, p. 301.) may be employed in similar circumstances, and in the same combinations. It should not be overlooked, that tonics ought to be preceded by vascular depletions, or alvine evacuations, where either is required; that the promoting of the latter, by suitable laxatives conjoined with, or intervening between them, or exhibited in enemata, will occasionally be required; especially when the disease proceeds from a morbid state of the secretions; and that they should be very cautiously resorted to in the sthenic or phlogistic varieties, even in their advanced stages.

132. *I. Aromatics and Absorbents* are often useful adjuvants in the advanced periods, or asthe-

nic forms of the acute, or in the chronic affection; more especially when occurring in the dark races. — (*a*) Blane prescribes *aromatics* with bitter infusions. Horn (*Archiv.* b. iii. p. 317.) prefers the *calamus aromaticus;* and Pringle, the preparations of *cinnamon.* The hot spices, especially *Cayenne* and *black pepper,* are most commonly used in warm countries, and are best suited to the natives, combined with tonics, absorbents, or mucilages. Active *stimulants* are too indiscriminately recommended by Brown, Marcus, and Zincke; but Vogler justly considers them injurious, unless in the adynamic or malignant states, in which, as well as in many of the chronic, the hot spices, thus combined, or given with ipecacuanha, camphor, and opiates; or with honey and small doses of the chlorates, or even of borax, in the chronic; will frequently be of great service. — (*b*) The ammoniacal, calcareous, and magnesian *absorbents* are most serviceable in the chronic and asthenic conditions, in the states of association here mentioned. In the phlogistic varieties, the subcarbonates of the alkalies, with refrigerants, anodynes, and diaphoretics, are most appropriate.

133. *K. Mercurials* are prescribed — 1st, as chologogue purgatives or laxatives — 2d, as simple alteratives; and, 3d, to procure their specific effects, whereby their alterative operation may be better secured, and a derivation from the seat of the disease established. — Cleghorn, Lysons, Clarke, Wright, Saunders, Richter, Jackson, Bampfield, and Annesley direct *calomel,* either alone, or with some purgative, generally at bedtime; and sometimes oleaginous laxatives and enemata subsequently, in order to accomplish the first of these intentions; and Duncan and Lemprière combine it with rhubarb. The chief objection to this practice is, that, however appropriate it may be in respect of the hepatic functions, a full dose of calomel generally increases the tenesmus; and the more, the oftener it is repeated, or the larger the dose.* This I have often remarked; and Sir J. M'Grigor states that calomel, given in the early stage of the acute unmixed disease, aggravated the symptoms. A similar observation is also made by Dr. Cheyne. Hargens and Consbruch prescribe calomel as a purgative in the verminous complication; whilst Horn and some others consider it, as well as mercurials generally, when frequently repeated, or, in large quantity, very injurious. Lind recommends the exhibition of the pure quicksilver with sulphur, gum acacia, and ipecacuanha, after emetics, with the view of removing obstructions in the large bowels. Leidenfrost directs small doses of calomel with opium. Johnson and Renton give four or five grains, every four or six hours, or much larger doses less frequently, also with opium, until salivation is produced; and Dr. Ferguson, half a grain with a grain of ipecacuanha, every hour, till the gums become affected; bleeding having been premised in the early stage of the inflammatory disease. *Inunction* is preferred by Boag (*Med. Facts and Observ.* vol. iv. n. 1.), Clarke, and Houlston, for procuring the specific effects of this medicine, in the chronic and complicated forms of dysentery. The observations already (§ 101.) offered respecting mercurials, will show the circumstances in which they may be employed, and the preparations that may be preferred. They are most appropriate to the sub-acute and chronic states, after depletions, when the substance of the liver is not actively diseased,; and are best combined with James's powder, or ipecacuanha, or Dover's powder. *Calomel,* or the *hydrargyrum cum cretâ,* should then be given; and if their specific effects soon follow, the circumstance may be considered favourable; but the former should not be persisted in. The latter, however, may be continued longer; particularly in conjunction with ipecacuanha, as being much less liable to increase the tenesmus than calomel; especially in the chronic disease. When dysentery proceeds from endemic sources, or when it assumes a very adynamic form, little benefit beyond its chologogue operation is produced by it; as I have had sufficient reason to believe, that, when given with the view of affecting the system, it favours relapses, and protracts convalescence.

134. *L. Ipecacuanha* was first employed in the cure of this disease by Piso, who brought it from the Brazils (*De Med. Braz.* lib. ii. *de Indiæ utriusque Re Naturali et Medica, &c.* Amst. 1658, fol. p. 231.), and had given it in drachm doses, and in the form of infusion. But it was not until Helvetius, who had come from Holland to Paris, gave some of it, with a knowledge of its virtues, to the physician of Louis XIV., who employed it successfully in the case of the Dauphin, then dangerously attacked by dysentery, that it came generally into use. Marais (*Ergo Dysent. affect. Radix Brasiliensis.* Paris, 1690.) and soon afterwards, Sloane (*Philos. Trans.* No. 238.), Heister, Vater, &c. further demonstrated its good effects. It has subsequently been very generally recommended, more particularly by Akenside, Lind, Hillary, Desbois, Linnæus, Duncan, Richter, and Hunnius. Since its exhibition by Piso, in very large quantities, Mr. Balmain* seems to have been the earliest

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* A most important fact was determined by the experiments performed by Mr. Annesley (*Sketches of Dis. of India,* 2d ed. 8vo. p. 374.), in order to ascertain the operation of calomel: and these experiments presented uniform results, viz. that, whilst the stomach and duodenum of dogs that had taken large doses of this preparation were much paler and less vascular than in ordinary circumstances, the colon and rectum, from the cæcum to the verge of the anus, were most acutely inflamed: thereby explaining the results of clinical observation; namely, that, although large doses of calomel calm those symptoms usually caused by increased vascular action, or inflammation of the mucous surface of the stomach and duodenum, they lower the vital energy of these important organs, and occasion tenesmus, griping pains in the course of the colon, mucous or bloody stools, hæmorrhoids; and, if persisted in, many more of the symptoms of dysentery, or even structural change of the colon and rectum. I am confident that dysentery becomes chronic; that an occasional indigestion lapses into a constant dyspepsia; and that habitual constipation often passes into strictures of the rectum, and hæmorrhoids into fistulæ; from the frequent exhibition of large doses of this medicine. Ingenuity cannot possibly devise a more successful method of converting a healthy person into a confirmed invalid, of destroying many of the comforts of existence, and of occasioning hypochondriasis and melancholy, than the practice of prescribing large doses of calomel on every trifling occasion, or when the bowels require gentle assistance; or because the patient erroneously supposes himself to be *bilious,* or is told so by those who should know better. The unfortunate word "*bilious*" is the scapegoat of the ignorant.

* The importance of the subject has induced me to give the substance of Mr. Balmain's communication. He states: — "I found the ipecacuanha, in small doses, always useful (in dysentery); and, in an accidental con-

to employ it in this manner, in conjunction with large doses of laudanum. A few years afterwards, Mr. Playfair adopted this practice in India; he giving from half a drachm to a drachm, with as much laudanum, and directing this dose to be repeated again and again if it should be rejected. Mr. English prescribed from a scruple to half a drachm, with double this quantity of laudanum; and Dr. Bateman confirmed the propriety of this method in all the stages and forms of the disease, as he had observed it in this country. More recently, Mr. Twining has modified this practice, and directed from four to eight — more frequently six — grains of ipecacuanha, with nearly as much extract of gentian, and occasionally also with blue pill or calomel, twice or thrice daily; premising bleeding and alvine evacuations in the acute disease, and resorting to mild purgatives, once a day, during the treatment. I had, in 1817 and 1818, given from eight to ten grains of ipecacuanha with opium, and sometimes also with calomel or blue pill, with the best results; having at first, by mistake, prescribed the simple powder for the compound; and afterwards continued the practice when the circumstance and the effects became known to me. Fischer directs ipecacuanha, when opiates fail of affording relief. Rhanoë (*Act. Reg. Soc. Haun.* vol. i. p. 33.) combines it with rhubarb; and Clarke, Schlegel, and Annesley give it in the form of infusion, which may also be exhibited as an enema. Dr. Dick praises it in the dysentery of India; the bowels being freely opened by clysters, whilst it is frequently given by the mouth. It may be conjoined with nearly every other medicine that can be exhibited in this disease — with refrigerants and evacuants in the inflammatory states, and with tonics and antiseptics in the malignant; and it will occasion as much nausea in one or two grains, as in sixty; this effect being less remarkable after its exhibition in the form of pill, and with bitters or opium, or even with calomel, than when taken in simple powder.

135. *M. Rhubarb* may be given either as a mild purgative, or as a gentle astringent. It is approved of by Borellus (*Cent.* ii. obs. 82.), Heister, Riedlin, Pringle, Jacobs, and Baker; is considered injurious by Kortum, Jawandt, Weber, Neumann, and Mursinna; and is prescribed only in the most advanced stage by Lind, Stoll, and Richter. It is much praised by Pringle, in the camp dysentery; especially when exhibited in large doses after emetics; and it is often of much service in the dysentery of *children*, conjoined with hydrargyrum cum cretâ, and minute doses of ipecacuanha, or with absorbents and Dover's powder. It is one of the best purgatives in the more asthenic forms; but it is injurious in the early stages of the inflammatory disease, or when the bile is obstructed; and it then often increases the tenesmus, as remarked by Wendelstadt and myself. It is apt, in many constitutions, to suppress the excretion of bile, even although it may open the bowels; and, upon the whole, it requires much discrimination in its use.

136. *N. Camphor* is favourably noticed by Brefeld, Marcus, Sponizer (Hufeland, *Journ. der Pr. Heilk.* b. v. p. 546.), and Mende (*Ibid.* Aug. 1810, p. 88.). Chambon directs it to be dissolved in oil; Michaëlis conjoins it with opium; and Osiander and Thomann (*Annalen*, 1800, p. 258.) employ it freely, both internally and externally. It is an excellent adjunct, in small doses, to refrigerants or diaphoretics, in the inflammatory or acute states; and, in large doses, with other antiseptics or tonics, in the malignant variety, and in the verminous and rheumatic complications. It is particularly serviceable in the nervous or typhoid state; and in the advanced stage, when nervous symptoms supervene. It may be given with ipecacuanha, either in pills, or in demulcents; and in emollient enemata. In the infectious conditions, it should seldom be omitted; and may in these, especially such as are malignant, be given in doses of ten or twelve grains.

137. *O.* The *terebinthinates* are valuable remedies in the asthenic and chronic forms. They were recommended by the Author (*Med. and Phys. Journ.* vol. xlvi. p. 107.), and have since been employed by several physicians. The circumstances in which they may be resorted to, and the manner of prescribing them, are manifest from what has been stated. They are not contra-indicated in the inflammatory varieties, although bleeding should be premised; and, when exhibited so as to act gently on the bowels, or in small enemata, they counteract the tendency to sloughing or ulceration; particularly in the asthenic varieties. Any of the *balsams* — but more particularly the Peruvian (F. 843.), Canadian, and copaiba — may be given with aromatics, magnesia, and demulcents; or with opiates; and be administered in enemata. They are most serviceable in the chronic disease, especially when assisted by frictions of the surface, deobstruent plasters, flannel bandages, and regulated diet. When the stools are frequent, and without pain, they are particularly serviceable, the hydrargyrum cum cretâ being taken with Dover's powder at night; or they may be alternated with either the hæmatoxylon, catechu, or kino, in mucilaginous or absorbent vehicles.

138. *P. Antiseptics* are praised by Wedekind. With a view to its antiseptic as well as to its aperient operation. Jackson and Crawford advise the use of *charcoal*, in doses of half a drachm or a drachm, frequently repeated. It may be advantageously given rubbed up with camphor. But the *chlorates* are much more powerful agents. The chlorate of potash is prescribed by Garnett,

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versation with a Mr. Wentworth, who assisted me, I formed the design of giving it in larger quantities. He informed me, that a man, who lived in the same town where he did, was uncommonly successful in the cure of dysentery, by using from a drachm and a half to two drachms of ipecacuanha, with laudanum. Mr. W. had, just previously to this conversation, given ninety grains of the powder, with forty drops of tinct. opii, to a man whose life was apparently near a close, and with whom evacuants had been used. There was a wonderful abatement of every symptom in the course of one night; and a repetition of the medicine, in smaller quantities, completed the cure in a few days. I did not hesitate to follow this practice; and gave the ipecacuanha frequently to the quantity of two drachms, with the addition of sixty drops of tinct. opii: and, in many cases, found that a dose or two was sufficient to remove every dangerous symptom. It answered the purpose best when given in the form of pills; and if the patient kept still, and lay on his back, with the head and chest tolerably elevated, nausea seldom or ever followed it; and oftentimes it happened that he had not a stool the succeeding day, although, previously, the gripings were violent, and the discharges of blood frequent and in large quantities." (*Mem. of Med. Soc. of Lond.* vol. v. p. 210.)

and the hydro-chloruret of lime by Reid. This latter, and the hydro-chloruret of soda, have been employed by me in this disease since their introduction into practice (see communication from the Author to Mr. Houlton, in the Appendix to this gentleman's excellent translation of Magendie's *Formulary*), and may be given with demulcents, or in various other states of association, and in enemata; especially in malignant states, or when sloughing is dreaded.

139. *Q.* Besides the foregoing, *various other remedies* have been recommended.—(*a*) All the ancients, and Diemerbroeck (*Observ. et Curat. Med. C.* n. 29.), Brefeld, and Paulini (*Cent.* iii. obs. 76.), among the moderns, prescribe *cold applications* to the abdomen, in the phlogistic states of the disease. Lotions and poultices, with the *nitro-muriatic acid solution*, are directed to this quarter by Mr. Annesley.—(*b*) The *nitrate of soda* (Niemann, Mayer, &c.) has been recently exhibited in dysentery, in doses of about a drachm, every four or five hours; or half the quantity each hour or two, in demulcent mixtures, with ipecacuanha (F. 929.). It acts as a refrigerant sedative and laxative, and is suited to the phlogistic states. The *sub-nitrate of bismuth*, particularly with ipecacuanha and opium, is extremely serviceable in some acute, as well as chronic, forms of dysentery. M. Lombard, and several others, had employed it with or without opium; and, more recently, MM. Récamier and Trousseau have found it to possess much efficacy as an antispasmodic sedative and astringent in this disease, and deserving adoption after depletions and evacuations have been practised in cases requiring them (*Gaz. Med.* Feb. 26. 1833.).—(*c*) *Nux vomica*, or its *extract*, and its active principle, *strychnine*, are recommended in the chronic disease by Hufeland, Fischer, Haakmann, Goeden, Klinge, Odhelius, Hagstroem, Graves, and Oswald; but Hargens, Weber, Michaëlis, and Horn state that they derived little or no benefit from it. In the particular condition now mentioned, either of the above preparations is often of use; more especially the extract, or strychnine, with ipecacuanha.—(*d*) *Hedera arborea* and *h. terrestris* are prescribed by Camerarius (*Memorab.* cent. iii. n. 79.); the fruit of the *Adansonia*, by L. Frank; *Armenian bole*, and the *terra lemnia*, or *sigillata*, by many of the older writers; *castor*, with nitre, by Schlegel; *musk*, with camphor and absorbents, &c., in the malignant states and last stages, by Hunnius; *wax*, with gum acacia, by Wedekind; the decoction of *vaccinium myrtillus*, or bilberry, with burnt spirit, by Fraser; and the preparations of the *hop* (F. 871. 900.), and of the *diosma crenata* (F. 231. 396.), by the Author. In the complication with rheumatism, Baker recommends *valerian, castor*, and *musk*; and, if there be little or no fever, the preparations of *guaiacum* with ipecacuanha and opium.

140. The chronic form of the disease will occasionally baffle every method of cure. Mr. Hooper states, that, in the cases of chronic dysentery, forming a large proportion of the sick which reached this country from Corunna in 1808, emetics, purgatives, calomel to salivation, Dover's powders with aromatics; opium in large doses, alone or with acetate of lead; starch injections with astringents, and various other medicines, were given without benefit. Balsam of copaiba, with aromatics and opium, rhubarb being also prescribed occasionally; and, in other instances, the decoction of bark with acids, opium, and a small dose of calomel being taken at night; were, upon the whole, most successful; a small quantity of wine having been allowed. The chronic disease is frequently prolonged by too much food, especially in children, and sometimes also in adults. The following are formulæ of a few medicines not commonly prescribed, but occasionally beneficial in the chronic states of the disease:—

No. 204. ℞ Infus. Cuspariæ ʒ xj.; Acid. Boracici gr. x.—℈ j.; Vini Ipecacuanhæ ♏ xx.; Tinct. Camphoræ Comp. ʒ j.; Syrup. Papaveris ʒ jss. Fiat Haustus.

No. 205. ℞ Sodæ Nitratis ℥ ss.—℥ j.; Pulv. Acaciæ ʒ ij.; tere simul, et adde Aq. Pimentæ (vel Cinnam.) ℥ vij.; Vini Ipecacuanhæ ʒ iij. M. Capiat Coch. unum, secundâ vel tertiâ quâque horâ. (Mayer.)

No. 206. ℞ Extr. Nucis Vom. gr. vj.; Pulv. Ipecacuanhæ gr. xij.; Extr. Humuli ʒ j. Misce probe, et divide in Pil. xxiv., quarum capiat binas, quartâ vel sextâ quâque horâ.

No. 207. ℞ Extr. Nucis Vomicæ gr. x.; Mucilag. Acaciæ ℥ j.; tere bene, et adde Mist. Amygdal. Dulc. et Mist. Camphoræ āā ℥ iij.; Vini Ipecacuanhæ ʒ ij.; Tinct. Camphoræ Comp. ℥ ss.; Syrup. Althææ ℥ ss. M. Sumatur Cochleare unum omni bihorio.

No. 208. ℞ Strychninæ gr. ij.; Pulv. Ipecacuanhæ gr. xij.; Conserv. Rosar. ℈ ij. Misce probe, et divide in Pilulas xxiv. Capiat duas, quartis horis.

141. *R. The Diet and Regimen*, in all the states of dysentery, should be strictly regulated. In the phlogistic variety, abstinence must be strictly enforced. In the more asthenic, gentle nourishment should be tried, and its effects upon the bowels and the constitutional affection carefully observed. *Milk*, either recent or boiled, is recommended by Alexander Trallianus, and most of the ancients. Cælius Aurelianus directs it with *honey*. This last is both an excellent article of diet, and vehicle for medicines, in many instances, and it may often be advantageously given with small doses of borax. Milk is praised both as food and medicine by Schmidt (*Ergo Dysen. Lac.* Monsp. 1649.), Borellus, and De Haen. Sydenham gave it by the mouth and in enemata. The celebrated Boyle (*Works*, vol. v. p. 113. *the Advantages of Simple Remedies*) directed milk, boiled with an equal quantity of water, until there remained as much as the milk first amounted to. A decoction of the leaves and flowers of the *verbascum thapsus* in milk is a popular remedy in Ireland. Mursinna and Vander Heyde prefer buttermilk; and Richer, whey. Milk may also be taken with the gums, honey, and lime water. Animal *gelatin* (Gautieri, in Hufeland's *Journ. d. Prac. Heilk.* b. xviii. p. 137.), in the form of jelly, or beef-tea may be tried with spices, in the asthenic and chronic forms; but they are not always found to agree. Farinaceous articles, as sago, tapioca, rice, biscuits soaked in beef-tea, mutton or veal broth, &c., are the most generally useful. If the patient have been habituated to a liberal use of wine or spirits, a little burnt brandy or wine may be given with these or with his beverages; and, in the more urgent cases, aromatics may be added. For *drink*, he may have weak gruel, or barley water, or either of the beverages prescribed in the Appendix (F. 588. *et seq.*) that will suit the case, and the treatment employed. He ought, from the first, to be placed between warm blankets; the bed-pan being used, to prevent his getting out of bed to the night-chair, and the chills con-

sequent thereon. In chronic cases, a large warm deobstruent plaster (§ 109.) should be applied over the abdomen, which ought to be surrounded by a flannel roller (Dewar, &c.). During *convalescence*, also, the diet and clothing should be carefully attended to; as an error in the former, and insufficiency of the latter, particularly at night, will often occasion *relapses*, to which there is a greater tendency in this, than in almost any other disease. *Change of air, exercise on horseback*, and *travelling*, with due precautions against cold and other injurious contingencies, are also very beneficial. After repeated attacks, or after the chronic disease, the *Harrowgate water*, or the artificial mineral waters of *Carlsbad*, or of *Marienbad*, in quantity sufficient to act gently upon the bowels; and subsequently those of *Eger*, *Pyrmont*, or *Spa*, with the occasional alternation of those of *Seidschutz* or *Pullna*; this plan being varied according to the peculiarities of the case; will often prove of service. Warm or tepid salt-water bathing, or the affusion of tepid salt water over the abdomen, will also promote a perfect recovery.

142. *S. Prophylactic measures* are sometimes necessary; particularly where the endemic causes abound, in autumn after rains, or in cold and wet seasons in warm climates; and when the disease is epidemic. These measures consist chiefly of avoiding the predisposing and exciting causes, especially injurious ingesta (§ 10. 22.); of filtering or boiling impure water, and of purifying it, by mixing with it antiseptic absorbents, as lime, the chlorates, &c.; of regular habits, and wholesome and digestible food; of wearing flannel next the skin, and shunning exposure to the night dews, or to cold and moisture; of sleeping in warm beds and airy chambers, elevated far above the soil; of avoiding the air of close apartments in which the sick are confined, and the emanations from the bodies of those thus circumstanced, or from the evacuations, when the disease presents any of the asthenic characters; of not using the water-closet or night-chair resorted to by those affected; of having recourse to the chlorurets, to destroy the noxious effluvia; by sprinkling the apartments with them, or throwing them into the vessels containing the evacuations, or into the water-closets; and of the absence of all dread of being affected.

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DYSMENORRHÆA. See Menstruation.

DYSPHAGIA. See Deglutition, Difficult.

DYSPNŒA. See Respiration, &c.

DYSURIA. See Urine, &c.

EAR—Nervous Affections of the.

1. *Certain diseases of the ear* will be here considered; which, although sometimes attended by disorder of *hearing;* and often terminating in impairment, or loss of this sense; are not necessarily accompanied by either. — In the article Hearing, the affections of this function will be viewed with reference to the lesions producing them, seated in different parts of the organ.

I. Noises in the Ear. Syn.—*Tinnitus, Susurrus, Sonitus, Sibilus, Syrigmus, Bombus, Aurium,* Auct. *Paracusis illusoria*, Good. *Das Ohrentönen, Ohrenklingen*, Ger. *Tintement, Bourdonnement de l'Oreille*, Fr. *Singing in the Ear.*

Classif. — 4. *Class*, 2. *Order* (Good). — I. Class, IV. Order (*Author*).

2. Defin. — *A sense of ringing, whizzing, or beating sounds in one or both ears, without external causes.*

3. i. These sounds vary in their *characters.* They are sometimes sharp, shrill, ringing, and successive; occasionally whizzing, roaring, acute, and continuous; and in other instances, beating or throbbing. They may be recurrent or intermittent, or devoid even of remissions, and be heard either in one or in both ears. M. Itard — the highest authority on diseases of the ear — divides them into, — 1st, the *false,* or those which have no existence whatever; and, 2nd, the *true,* or such as are seated in the interior of the head, or of the ear, but without being caused by external sonorous bodies. *Tinnitus aurium* is most frequently attended by a slight degree of deafness, which, in some cases, it produces, and in others is merely coincident with it. (*a*) *True tinnitus* may proceed from — *α.* cerebral plethora, congestion, or determination; — *β.* the impeded or obstructed return of blood from parts within the head; — and, *γ.* mechanical obstacle to the free circulation of air in the different compartments of the ear; but without completely preventing its entrance, for then the noise would be replaced by simple deafness. When the noises depend upon the state of the cerebral circulation, they are generally beating, heavy, hissing, or whizzing; frequently correspond with the pulsation of the carotids, which also is often strong; and are arrested by pressure of these vessels. (*b*) *False tinnitus* is — *α. idiopathic,* as when a very loud noise has injured the function of the auditory nerve; and, *β. symptomatic,* when allied to some nervous affection, often unappreciable in respect either of its cause or of its nature, or sympathetic of disorders of some other organs. Thus, this affection often attends indigestion, and hypochrondriasis, especially in persons devoted to prolonged and exhausting mental exertions; sometimes debility or hysteria, particularly in delicate females, who have suffered from excessive discharges, or who are addicted to venereal indulgences or manustupratio; and occasionally disorders of the *prima via,* as worms, torpid states of the colon, &c. In this variety, the noises are, in some cases, of a very unusual and even singular kind; and in hypochondriacal, nervous, or melancholic persons, give rise to various fancies or even hallucinations. In the case of a lady, for whom I was lately consulted at the same time with two other physicians, and who complained of noises in the ears after having suffered in her general health from too frequent returns of the catemenia, in excessive quantity, there gradually arose in the mind of the patient, an idea that persons were engaged whispering behind her; and ultimately it took so firm a possession of her mind, that it amounted to an hallucination, influencing both her judgment and her actions.

4. ii. Noises in the ears are most frequently *caused* by interruption to the free circulation of air through the Eustachian tube. Hence they are common attendants on catarrhs, and on enlargement of the glands, &c. in the vicinity of the tube;

and are often produced by currents of cold air falling on one side of the head or directed towards the ear, as by travelling in an open carriage, or with a carriage window open; or by having the hair cut, when abundant, in cold weather. When caused by partial obstruction of the eustachian tube, a loud noise or crack is heard upon yawning; and the sounds often cease, or are diminished for some time afterwards. They are frequently a troublesome symptom during convalescence from fevers; and are sometimes attendant upon rheumatic affections of the head or neck; in both which circumstances, they are probably dependent on morbid sensibility of the auditory nerves, or on determination of blood to the head, or on both. Mr. Tod imputes them chiefly to a faulty state of the secretions of the ear, in respect either of quality or quantity; Mr. Buchannan, principally to an imperfect secretion of cerumen. Their dependence upon derangements within the head, as well as upon affections of distant organs, should always be kept in mind, whilst investigating their nature and relations; and hence the propriety of viewing them in the comprehensive manner adopted by M. Itard.

5. iii. Treatment. — The ancients, especially Celsus, paid considerable attention to this affection; many of these remedies are active and appropriate. It is obvious that the means of cure should be directed to the pathological conditions on which it depends. In the *true tinnitus*, especially when it is of a beating kind, vascular depletions should be prescribed. M. Itard has seen it instantly vanish upon opening the jugular vein. Active and continued purging, with due attention to the digestive organs, is also requisite in these cases. *Symptomatic false tinnitus* should be treated according to the nature and seat of the primary affection. When it is connected with rheumatism, Grapengiesser and Ritter advise having recourse to electricity or Galvanism. For the *true nervous* or *diopathic affection*, tonics, nervines, blisters behind the ears, stimulating gargles, and antispasmodics may be prescribed. Heister recommends in such cases fumigations of the ears with the vapour of a hot vinous infusion of rosemary and lavender; M. Itard, fumigations with æther directed to the meatus, frictions of the scalp, and warm applications, with the view of promoting an abundant transpiration in this situation; and Mr. Buchannan, two drops of the mixture of equal parts of pyroligneous acid, spirit of sulphuric æther, and spirit of turpentine to be introduced into the ear. The digestive organs should be assisted by stomachics, aperients, or purgatives; and transpiration promoted by gentle diaphoretics, and moderate exercise in the open air. When tinnitus arises from cold, the same means, or those usually resorted to in Catarrh, with attention to the state of the bowels, will be appropriate. Gargles also with the muriate of ammonia, or nitrate of potash, or this latter and the sub-borate of Soda, will also be useful. In this form of the affection, little further should be attempted, unless it become *chronic*, from partial obstruction of the tube, or diminished secretion of cerumen, in which cases it is generally associated with some degree of deafness, when it will require the treatment advised, in such circumstances, in the Article Hearing — *diminution of, &c.*

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II. Earache. Syn. — *Otalgia* (from *οὖς ὦτος*, the ear, and *ἀλγέω*, I pain); *Ohrenschmerz*, *Ohrenzwang*, Germ.; *Otalgie*, Fr.

6. Defin. — *Violent pain, generally in one ear, suddenly supervening, and often abruptly departing, without fever.*

7. i. *Earache* is most frequently *symptomatic* of inflammation of the ear, or of the presence of foreign bodies, or of insects in the meatus, or even of congestion or inflammation within the head. It sometimes also attends inflammation of the pharynx, or of the tonsils and fauces, or of the parotid gland; and is occasionally consequent upon small-pox, scarlet fever, and erysipelas of the adjoining parts. More rarely it is *idiopathic*, or a *purely nervous affection*, seated either in the nervous filaments sent to the internal parts of the ear, or in that part of the facial nerve passing through the aqueduct of Fallopius, or in the filaments of the acoustic nerve, which seems the least probable seat. The *idiopathic*, or true nervous otalgia, is at its maximum of intensity on its invasion; and, unlike the pain attending otitis, does not gradually increase in severity, nor is it attended by throbbing, and inflammatory fever. Its duration is very uncertain. Sometimes it disappears abruptly in a very short time, occasionally being followed by neuralgic or rheumatic pains in some part of the face or head, or even in a remote part of the body — an occurrence further distinguishing it from otitis — and frequently again returning to the same ear, and very rarely to the other. When the pain is excessive, it often irradiates along the nervous filaments over the same side of the cranium, or of the face, or both, the eyes sometimes becoming red and watery; but it seldom or ever occasions delirium or convulsions (Itard), unless it be connected with inflammation of the internal ear, or is produced by insects or foreign bodies in the meatus. When, however, the pain proceeds from this latter cause — an occurrence which is not unfrequent, particularly in children, and of which I have seen several instances amongst the poor and squalid — dangerous and repeated convulsions often supervene. Noises in the ear, and often a slight deafness, accompany otalgia; indicating the coincidence of extreme exaltation of sensibility in the parts composing the ear, with a diminished power of perceiving sounds; and evincing that the acoustic nerves are not the seat of the exquisite pain that is felt. Like all nervous affections it is never constant in its course: it may be continued, or intermittent; may recur several times, after irregular intervals; or it may appear once and never return.

8. ii. The Causes of earache are those of all

other nervous affections. Otalgia is much more common in females than in males; and it sometimes attends the early periods of pregnancy. It is often symptomatic of disorder in the *prima via*, and is frequently connected with rheumatism, particularly of the face, head, or neck; as well as with facial neuralgia and toothache. M. ANDRAL treated a case, in which it alternated with sciatic neuralgia. M. FAUCHARD records an instance where it long resisted all treatment, until a carious molar tooth on the same side as the affected ear was extracted; and Mr. PETTIGREW, in the case of a lady suffering excruciating agony from this affection, directed the wisdom tooth to be drawn, which he correctly inferred to be its cause, and the pain was instantly abated. Various writers have seen otalgia consequent upon the disappearance of rheumatism and gout. A case following rheumatism occurred in my own practice; and another, produced by a current of cold air falling on the ear. This last is, perhaps, one of its most frequent causes. Earache may exist for some time, and either excite, or be merely contingently followed by, otitis, which, however, may have commenced long before its usual signs were fully developed.

9. iii. TREATMENT. — If this affection be *symptomatic*, the means of cure must be directed to the primary disease. (See EAR — *Inflammation of*.) If it arise from a foreign body, this should be extracted without greatly increasing the irritation; but if that cannot be accomplished, it will be better to wait its spontaneous discharge by means of the increased secretion which will be occasioned. Insects may be dislodged by injecting a sufficient quantity of an emollient oil into the meatus; or by introducing a small piece of sponge or cotton, with oil, by means of a probe. Infusion of tobacco, various other narcotics, and even acrid substances, have been directed to be employed for this purpose; but I believe that they may sometimes prove injurious,—an opinion also entertained by M. ITARD. For the more obviously *nervous or idiopathic otalgia*, the ancients recommend the injections of warm emollient or stimulating oils; or these conjoined with anodynes. CÆLIUS AURELIANUS advises tepid oil to be dropped into the ear, and wool to be stuffed into it; he also directs fomentations, poultices, scarifications, and leeches,—remedies often serviceable, and generally safe. M. ITARD states, that he has seen opiates introduced into the meatus for this affection followed by cerebral symptoms: he therefore prescribes the injection of tepid emollients, such as milk, the decoction of marchmallows, &c.; means but little different from those mentioned by the authority just referred to. In addition to these, he recommends the mouth of a phial containing three drachms of HOFFMANN's anodyne, and half an ounce of water, to be directed to the meatus, the phial being kept immersed in warm water; and an abundant transpiration from the surface of the head to be excited, by sponging it with warm water for a quarter of an hour, afterwards rubbing it for some time with warm flannel, and lastly covering it by an impermeable or gummed silk cap. *Blisters* behind the ear, or on the temple, and medicines to promote the alvine secretions and excretions, are also suitable. Dr. LEHMAN directs a mild purgative, and the introduction of cotton into the meatus, charged with tincture of digitalis. Dr. KENNEDY prescribes an *emetic* as early as possible in this affection; and after vascular depletion, if inflammatory action seem to be present. I found an active emetic almost immediately abate the excruciating pain, in the case of the wife of a celebrated author. After free vomiting, which may in some cases be promoted by the warm infusion of chamomile flowers, a dose of calomel, either with, or followed by, a purgative; and gentle diaphoretics; will be of much service. In every case, the state of the gums and teeth should be examined. Where the head is free from congestion, warm baths, vapour or fumigating baths, and narcotics with antispasmodics internally, may be tried. Tonics, especially the sulphate of quinine, the preparations of iron in large doses; valerian, or serpentaria with cinchona; or an infusion of valerian with the ammoniated spirit of colchicum; may also be prescribed, more particularly if the otalgia be of an *intermittent type*, or of a *rheumatic character*, and if morbid secretions have been evacuated by an emetic and purgatives. In the rheumatic or gouty state of the complaint, the decoction or infusion of cinchona with valerian, the subcarbonate of soda, and the ammoniated spirit of colchicum, will be most efficacious. On the first indication of inflammatory action in the ear, or within the head, the jugular vein on the affected side should be opened, or other modes of depletion instituted, and active cathartics administered.

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EAR — INFLAMMATION OF THE. SYN. — *Otitis*; *Empresma Otitis*, Good. *Ohrenentzündung*, Germ. *Otite*, Fr.

CLASSIF. — 3. *Class*, Diseases of the Sanguineous Function; 2. *Order*, Inflammations (*Good*). III. CLASS, I. ORDER (*Author*).

10. DEFIN. — *Ingravescent pain in the ear, with tenderness on pressure, or on moving the lower jaw; with inflammatory fever, and frequently impaired or confused hearing.*

11. Inflammation may affect both the external and internal ear at the same time; and it may commence in either, and be thus confined, or extend to both. It assumes various grades of severity; its duration being equally indefinite. The more *acute states* of the disease will be first considered; and next, those which are chronic, and which, from being characterised by a discharge from the external meatus, have been called *Otorrhœa*.

12. I. ACUTE INFLAMMATION OF THE EAR — *Otitis Acutus* — has been accurately observed only in modern times; and more especially by J. P. FRANK, ITARD, and LALLEMAND. — (*a*) Sometimes the *external* conduit or meatus is the chief seat of inflammation — *External acute otitis*. — (*b*) Frequently the cavity of the drum, with its dependencies, the membrane of the tympanum, Eustachian tube, and mastoid cells; or the *internal* ear, strictly speaking — as the vestibule, the semicircular canals, and the cochlea; either separately or conjointly, is the seat of the disease, —

Internal acute otitis. These will be described separately, but with reference to their mutual relations.

13. i. SYMPTOMS. — *A.* Of *External Otitis.* — Inflammation of the external conduit frequently commences with slight pain, or a sense of heat, or of intense itching or irritation, gradually increasing to an acute or distressing degree. It is sometimes lancinating, or is increased at intervals; and it occasionally gives rise to various nervous symptoms. In other cases, the disease runs its course without being attended by much pain. But pain is always augmented upon pressure; by the motions of the lower jaw; and by the contact of cold air, and too warm fluids. Hearing is also impaired or confused; and noises are heard in the ear. Upon examining carefully the meatus, several of the changes about to be noticed (§ 17.) are observable. From a few hours to three or four days after the commencement of the symptoms, a fluid begins to be discharged from the meatus, that is generally at first thin, limpid, or sanguinolent; but gradually becomes thicker, and assumes puriform characters; being whitish, yellowish, or greenish; inodorous, or fœtid; and sometimes so acrid as to irritate the part with which it remains for some time in contact. With the increase of the discharge, the pain usually abates, unless inflammation extends to the inner ear. Afterwards, as inflammation declines, the fluid passes into a consistent or caseous matter, that accumulates in the meatus, and requires to be removed; and is followed by a more abundant secretion of wax than usual. Occasionally, as the discharge from the interior of the meatus decreases, a serous exudation from behind the ear supervenes.

14. *B. Internal Otitis* is sometimes attended merely by local symptoms: but whenever the inflammation is very acute, and the pain great, more or less fever is present, with headach, watchfulness, and disorder of the natural functions. The chief difference between the course of this and external otitis is contingent upon the parts of the internal or middle ear chiefly affected. Thus, the matters secreted by the inflamed surface of the cavity of the tympanum can be discharged externally only with great difficulty, owing to the extension of inflammation to the adjoining portion of the Eustachian tube, and its consequent obstruction; their retention giving rise to a most distressing sense of distension, with painful throbbing, febrile reaction, and nervous disturbance. — *a.* Internal otitis often *commences* with severe headach or hemicrania; and an intense, acute, continued, and deep-seated pain, with clanging, loud, or beating noises, in the ear. These symptoms become more severe, and are generally attended by heaviness in the head, and often with a sense of bursting or distension in the ear. The eyes are now injected and watery; the face anxious or red; the skin somewhat hot; the pulse frequent, but not full; the tongue loaded or white; and all the natural functions disordered. In some cases, particularly when the more interior parts are inflamed, it requires attention to connect the cerebral symptoms with their origin; but the pain is generally referred more especially to the internal ear; is attended by severe tinnitus; and is increased on mastication, and on moving the head, and on the least noise. In other instances, the pain is felt at the bottom of the meatus, which is seen, on examination, exempt from lesion; or in the mastoid process. Delirium, especially at night, often attends the complaint at its acmé; or convulsions, in children. The fever often assumes a nervous or typhoid character, if the inflammation do not readily terminate in resolution. The above may be called the *first stage,* in the most severe cases: but those which are less violent, or *sub-acute,* or actively treated at the outset, subside partially in from twenty-four to forty-eight hours; and afterwards more slowly; the functions of the organ still remaining more or less impaired for some time, but without passing into the next stage.

15. *b.* When the disease does not thus terminate in *resolution,* the products of inflammation accumulate in the cavity of the drum and dependencies, and force their way externally, their appearance commencing the *second stage.* These matters may be discharged — *α.* through a spontaneous perforation of the membrane of the drum; — *β.* along the Eustachian tube; and, *γ.* through a fistulous opening in the mastoid apophysis. The first of these is the most common — its frequency being to that of the second in the proportion of six to one (ITARD); and the third comparatively rare. The discharge by perforation of the tympanum generally takes place suddenly; a large quantity of matter being voided, as if an abscess had burst; and the patient experiences relief, which increases with the continuance of the evacuation. Sometimes the great consistence of the secretion prevents its passage through the opening in the membrane, and causes its reaccumulation in the cavity; and occasionally the irritation and inflammation produced by it in the meatus, or the incrustation of it on this passage, obstructs this outlet, and has the effect now stated, with the consequences of prolonging or augmenting both the local and general symptoms. It is necessary, therefore, to ascertain the permeability of the meatus, as well as that of the Eustachian tube, which most frequently is obstructed in these cases. This is to be done both by inspection of the external conduit, and by causing the patient to expire forcibly whilst the mouth and nose are shut. If the Eustachian tube be permeable, bubbles of air mixed with the fluid will escape at the meatus. In the much less frequent cases of the discharge of the accumulated fluid along the Eustachian tube, a sensation is felt in the posterior fauces or throat, as if an abscess in one of the tonsils had burst; a sudden expectoration of a muco-puriform, sanious, or purulent matter taking place, and continuing, in smaller quantity, for some time afterwards, or returning after indefinite intervals.

16. *C.* From what has been stated, it is evident that the inflammation may extend from the external to the internal ear; but rarely from the latter to the former, unless matter finds its way through the tympanum. The *duration* of the disease varies from two to thirty, or even forty, days; but the symptoms lose their severity before a month is elapsed, and become *chronic,* generally in the form of *otorrhœa,* which may, however, follow a sub-acute or an originally slight or chronic affection. After acute otitis has terminated, as above (§ 14.) in resolution, or by the discharge of matter externally (§ 15.), hear-

ing often remains impaired, owing to the lesions consequent upon it; and is either recovered after some time, or permanently diminished. These lesions are thickening of the cartilaginous parts of the conduit; permanent thickening of the skin or dermis of the meatus, and narrowing of its canal; thickening, opacity, or perforation of the membrane of the drum; loss of one or more of the small bones; and obstruction of the tube of Eustachius. Caries of the mastoid apophysis, and of the petrous portion of the temporal bone, with destruction of the internal organisation of the ear, and disease of the adjoining membranes and portions of the brain, may also be caused by internal otitis; sometimes at a period very remote from the first manifestation of disease in this organ.

17. ii. The structural Changes produced by acute otitis are, injection of the delicate dermis lining the auditory conduit, with more or less tumefaction, and entire or partial obliteration of the canal. Pustular formations, at first red, after whitish and filled with pus, are seen in the surface of this tissue, varying in size and number: sometimes transparent vesicles are met with instead of these. The fluid contained in these pustules or vesicles either is absorbed, or escapes through their parietes, giving rise to ulcerations of variable depth and size. The lining of the meatus, when inflamed, presents a striking resemblance to an inflamed mucous membrane; and the fluid which it secretes undergoes the same changes as that proceeding from an inflamed mucous tissue. Thus, in the slighter grades of inflammation, a mucous fluid fills the meatus; in an advanced stage and grade, purulent matter is formed; and occasionally, in children, a membranous or albuminous exudation forms upon the surface of the canal. The osseous parts of the internal ear are seldom affected excepting in otorrhœa; but the cartilaginous portion is not infrequently softened, or even perforated, in the acute disease. In rare instances, the perforation takes place from without, owing to an abscess formed between the mastoid apophysis, the angle of the jaw, and the conduit. The inflammation may be limited to the mucous membrane of the tympanum, and give rise to the collection of a mucous, serous, sanguinolent, purulent, or curd-like fluid in the cavity. From the mucous surface of this cavity, inflammation may extend — *α.* to the surface of the Eustachian tube, causing obstruction of it, either by the diseased secretion, or by the temporary swelling of the inflamed part; — *β.* to the mastoid cells, producing tumefaction of the mastoid apophysis, and occasionally a fistulous opening through it; — *γ.* to the membrane of the tympanum, which, often in a very short time, is softened and perforated, allowing the discharge of the matters collected in the cavity, sometimes with one or more of the destroyed small bones.

II. Chronic Inflammation of the Ear — *Chronic Otitis; Otorrhœa* (from οὖς, ὠτος, *the ear*, and ῥέω, *I flow*); *Ohrenflus*, Germ.; *Otorrhée*, Fr.

18. i. History, &c. — A discharge from the ears may be seated in the external, or in the internal, ear, or in both; or may proceed from an abscess opening into the ear. It has been distinguished into — *a. Mucous*, or *Catarrhal otorrhœa;* and, *b. Purulent otorrhœa*, from the appearance of the discharge; the former often preceding the latter, which is much more serious, as being generally dependent upon caries of the bone. Otorrhœa is often a termination of acute otitis; but it is frequently a primary disease, and not preceded by any acute symptom, not even by pain; the discharge being the only phenomenon. — *a. Mucous otorrhœa* may be confined to the external ear, the lining membrane being either scarcely altered, or red, tumefied, covered with vegetations; or partially adherent, and the canal partially or altogether obstructed or obliterated. This species of otorrhœa is most common among children of a delicate, lymphatic, or scrofulous constitution; frequently resisting treatment for years, and yet subsiding spontaneously, or disappearing at puberty. Serious symptoms seldom accompany it; but sometimes hearing is somewhat impaired. The discharge varies greatly in colour, odour, and quantity; but little importance need be attached to these variations. It is often scanty at one time, and copious at another; or even disappears for a while, and returns in greater or less abundance. The obstructions already noticed (§ 15.) in respect of the discharge in acute otitis, also occasion this change. In some cases, the sudden interruption of the discharge may be followed by pathological phenomena in some other quarters. M. Itard has seen engorgements of the lymphatic glands of the neck, tumefaction of the testes, affections of the eyes, porriginous eruptions on the scalp, and dangerous diseases of the brain, follow its disappearance. I have likewise seen the same results, as well as partial paralysis of the nerves of the same side of the face, in three instances, two of which were referred to Sir C. Bell, in illustration of the discoveries of this eminent physiologist. M. Lallemand has remarked the alternation of otorrhœa with an attack of rheumatism, with catarrhus vesicæ, and with leucorrhœa. Mucous otorrhœa may also be seated in the cavity of the drum: in this case, the membrane is perforated, and the symptoms are nearly the same as now described.

19. *b. Purulent otorrhœa* may, like the preceding, but much more rarely, be the result of a porriginous inflammation of the lining membrane of the meatus; or the matter may, in the first instance, proceed, as stated above (§ 15.), from acute otitis, the tympanum having been spontaneously perforated; and, owing to the access of air whilst it lodges in the cavity of the drum, mastoid cells, and other parts, become more and more acrid; inducing ulceration in the membrane lining these parts, and ultimately inflammation and caries of the osseous structure itself. As soon as these changes take place, the discharge is more sanious than purulent — or of a greyish tint, mixed with red; exhales a peculiar odour, and stains a silver probe of a bronze colour; carious portions of bone being sometimes also detached at an advanced stage. The patient, in these cases, generally complains of a dull pain in the ear, extending over the side of the head; of impaired hearing; with dulness, and a heaviness of expression. The caries is, in most instances, as here stated, the consequence of the disease of the mucous membrane lining the several auditory canals; but it is also, although much more rarely, the primary disease. In both cases, the otorrhœa is *idiopathic*. Abscess formed in the brain may form a passage through the petrous bone, which

had become secondarily affected and destroyed; the caries being, in this case, *symptomatic*. This occurrence, however, seldom takes place.

20. The mastoid process is more frequently the seat of caries than any other part; and is, consequently, the source of purulent otorrhœa in most instances; disorganisation proceeding also most rapidly in this situation, which is painful and tender on pressure, the external parts being swollen and œdematous. After some time, the mastoid cells are perforated; the skin reddened; and an abscess forms, bursts, and becomes fistulous. On injecting a fluid through the external opening, which is generally close behind the ear, it frequently escapes by the meatus, or the Eustachian tube. Instead of an opening in this situation, the pus sometimes penetrates between the muscles attached to this process, and the abscess opens low in the side of the neck. The diagnosis is then more difficult. In some instances, the carious mastoid apophysis is not perforated, but the pus collected in its cells is evacuated through the cavity of the tympanum and the external meatus. Occasionally the carious part of the process is gradually melted away in the sanio-puriform discharge, without any disease of the soft parts covering it; the gradual destruction of it causing the disappearance of the prominence it occasions. M. LALLEMAND, therefore, directs the comparative state of both mastoid regions to be examined in cases of purulent otorrhœa. The bony parietes of the external auditory conduit is sometimes the seat of caries; but much more rarely than the preceding. The part of the petrous portion of the temporal bone, which contains the semicircular canals, is, according to ITARD and LALLEMAND, that which is most frequently diseased after the mastoid process. In other cases, caries is seated in the parts forming the aqueduct of the cochlea, or the aqueduct of FALLOPIUS; or, lastly and more rarely, the internal auditory canal. But if, in some instances, the disease is thus limited, it is not so in others; various portions of the osseous structure being either simultaneously or successively attacked. The petrous portion may be altogether destroyed, and the adjoining bones also invaded, and more or less injured. M. LALLEMAND has seen, in the same case, caries of different parts of the temporal and of the occipital bones, and even of the first vertebra also.

21. *α*. Caries of the petrous portion of the temporal bone, in some one of the states now noticed, necessarily induces disease of the membranes, and frequently also of the brain. — (*a*) It sometimes happens, that acute cerebral disease suddenly supervenes during otorrhœa, and death quickly follows; the petrous bone being found carious upon dissection, and the membranes adjoining extensively inflamed; but the brain itself sound. — (*b*) In other cases, the cerebral symptoms take place more slowly, or assume the characters of chronic meningitis or cerebritis (see BRAIN, § 160. *et seq.*); either partial separation of the dura mater, with or without adhesion of the two lamellæ of the arachnoid, or softening of the brain, or abscess seated in the cerebral structure, or both these alterations of the membranes and brain, being found after death. These lesions are observed more frequently at the anterior, than at the posterior, aspect of the petrous bone. Sometimes, instead of this portion of the temporal bone, a large collection of pus communicating with the middle ear is only found. The abscess formed around, or in the vicinity of, the petrous bone, consecutively upon disease of this part, often makes its way externally to the meatus; a similar channel of evacuation also being formed, but much more rarely, when caries of this bone follows the formation of cerebral abscess (ANDRAL).

22. *β*. The *Symptoms* which indicate the extension of disease from the ear to the brain, or its membranes, are nearly the same as characterise the idiopathic states of inflammation of these structures (BRAIN, § 146. *et seq.*), according to the acute and chronic states they may assume. Whilst the ear only is diseased, the pain in the head appears to proceed from the ear as its source; but when the parts within the head become affected, the cerebral symptoms are most prominent, and often obscure or altogether mask the disease of the ear. If, at an advanced stage of chronic otitis, the discharge be suppressed, or even much diminished, these symptoms are very liable to come on in a very severe form; and if some time elapse between the disappearance of the one, and the supervention of the other, and if the history of the case be not attentively investigated, the disease of the ear may be altogether overlooked; and what is strictly a symptomatic affection of the brain, or its membranes, treated inappropriately as an idiopathic seizure. — When inflammation extends to the parts within the head, the patient complains of a deep-seated, and often throbbing pain, towards one side, with heaviness of the eyes, stupor, and slight delirium. The pulse is small, sharp, and quick; the tongue furred; and the febrile symptoms, which are usually slight, increased in the evening. There are also tenderness of the scalp near the affected ear, so that the patient prefers to lie on the opposite side, thereby favouring the lodgment of the morbid secretion in the ear; and sometimes convulsions with paralysis. During the progress of caries of the bony structure, even before the disease has extended to the membranes and brain, more especially when the parietes of the aqueduct of FALLOPIUS are implicated, neuralgic pains in the face, inflammation of the conjunctiva of the eye, convulsive motions, and ultimately paralysis, of the muscles of that side of the face, &c. take place, owing to lesion of the trunk of the facial nerve. Since attention was directed to these associations by Sir C. BELL, numerous cases illustrative of them have been observed by LALLEMAND, and others; and several have been seen by myself.

23. *γ*. The *duration* of otorrhœa is most indefinite. It may continue for several weeks or many years; and may resist all means. Sometimes it disappears either spontaneously, or during medical treatment. In other cases it presents a somewhat intermittent form, continues long to do so, and ultimately terminates either favourably or fatally, as stated above. In two instances which terminated in this latter manner, — at upwards of forty years of age in the one, and about thirty in the other, — I ascertained that otorrhœa commenced in early childhood, and had continued, with various remissions and intermissions, to that age, when cerebral symptoms came on. In these prolonged cases, the discharge varies much in quantity. When the Eustachian tube is not obstructed, it often

passes into the throat, and discolours the sputum; or is at one time evacuated by this route, at another by the meatus. During catarrh or sore-throat, the symptoms are generally aggravated, chiefly in consequence of obstruction to the discharge of matter.

24. ii. THE PROGNOSIS of otorrhœa depends — 1st, on its cause, — thus the syphilitic is much less dangerous than the scrofulous disease; — 2d, on the nature of the discharge, — the puriform being much more unfavourable than the mucous; — 3d, on the age, — it being much less serious in childhood, than at or after puberty; — 4th, and most especially on the presumed extent of disorganisation, and caries; the occurrence of local paralysis, but particularly of the cerebral symptoms alluded to (§ 22.), being very unfavourable. All chronic discharges from the ear, however slight they may seem, should be viewed in a serious light, not merely as they generally lead to deafness, but as they are also liable to be followed by fatal cerebral disorganisation.

25. iii. CAUSES. — *A. The predisposing causes of otitis and otorrhœa* are, delicacy and susceptibility of frame; the scrofulous diathesis; the periods of dentition and childhood; the syphilitic poison; and disorders of the prima via and digestive organs generally. — *B.* The *exciting causes* are chiefly a current of cold air; exposure to cold air after the removal of the hair; the introduction of foreign bodies into the meatus; accumulations of wax in this part, or the use of irritating injections; herpetic eruptions on other parts of the body, or porriginous eruptions on the scalp, and the suppression of either; inflammatory affections of the throat, tonsils, and fauces; and determinations of blood to the head. Either the acute, sub-acute, or chronic states of the disease may supervene in the course, or after the subsidence, of any of the exanthemata, or even of continued fever, but more especially scarlet fever, small-pox, and erysipelas. Difficult dentition, the irruption of the wisdom-teeth, caries of the teeth, and injuries of the head, are more rarely exciting causes. M. ITARD thinks that falls upon the head may occasion otitis without producing disease of the brain. It may follow even slight attacks of catarrh in children; and in some instances its cause is by no means evident.

26. III. TREATMENT. — The means of cure differ according to the acuteness, the seat, the stage, and the particular characteristics of the inflammation; and the results to which it has given rise.

27. i. OF THE ACUTE. — *A. Acute external Otitis*, whilst the pain is moderate, and febrile symptoms are absent, requires chiefly the removal of all sources of irritation, the injection of tepid and simply emollient fluids, and the application of poultices. When the pain is severe, and febrile commotion is present, general or local *bleeding* — the former in patients who are more than a few years of age, either from the arm, or from the jugular vein — should be prescribed; and, if there be not much fulness of blood in the head present, an *emetic*, as recommended by Dr. KENNEDY, exhibited. After its operation, a full dose of *calomel* with *James's powder* ought to be given, and followed in a few hours by an active *cathartic* draught. If the symptoms be not greatly relieved by these, a number of *leeches* should be placed behind the ear, or *cupping* performed on the nape of the neck, a *blister* being subsequently applied in this situation. In this stage and state of the disease, the introduction of any substance into the meatus beyond simple emollient injections occasionally, is more injurious than beneficial. Some writers recommend the use of *narcotics*; but unless the harmless decoction of poppy heads, they are as well abstained from. M. ITARD advises two or three grains of *camphor*, rolled in cotton, to be placed in the meatus, if there be no discharge; but this appears more suitable in sub-acute and slight cases, than in those that are very acute. Dr. LEHMAN directs the tincture of *digitalis* to be dropped into the ear, or cotton impregnated with it to be introduced. When a discharge takes place, the simplest tepid injections only should be employed; and, during the course of treatment, a free action on the bowels kept up. The blister on the nape of the neck should also be preserved open; and leeches again applied behind the ear. When the pain has subsided, a mucous discharge only remaining, M. ANDRAL prescribes slightly astringent *injections*, and particularly those consisting of the waters of Barrèges. I believe that the less they are employed the better; attention to the functions of the stomach and bowels, and change of air, with such means as may promote the general health, being the safest and best means.

28. *B. Acute internal Otitis*, demands the prompt and decided use of the above remedies. After general *depletion*, the repeated application of leeches behind the ear, at short intervals, is often requisite, with external *derivation*, &c. If the exhibition of an *emetic* after these fails of removing the acute symptoms, *antimonials* should be given, so as to produce nausea and keep down vascular action; the bowels being also freely acted on. For this purpose, *calomel* with small doses of *tartar emetic* or James's powder should be prescribed every three or four hours. These means will generally be followed by resolution of the inflammation, and subsidence of the symptoms, if resorted to at an early period. But if the disease pass on to suppuration, the patient will complain of a throbbing pain, with a bursting sensation in the ear, and persistence, or even aggravation of his sufferings. In this case, an additional indication must be fulfilled, viz. the speedy evacuation of the matter collected in the cavity of the drum, as its retention will materially aggravate the disease, and endanger the bony structure of the ear. Several authors have advised, in such circumstances, the application of fomentations and *poultices*, to accelerate the ulcerative perforation of the tympanum and the external evacuation of the matter. These are, however, often inefficient. In order to remove obstruction of the Eustachian tube usually existing in such cases, *gargles* with a solution of the sub-borate of soda, or of nitre and it, may be employed. Some writers recommend the smoke of tobacco to be forced into the tube whilst the mouth and nose are shut. But these means do not often succeed. Instead of waiting for the spontaneous evacuation of the pent up matter, which insinuates itself under such circumstances into the various sinuosities of the ear, M. ITARD advises, and has in many instances practised with benefit, *perforation* of the membrane of the drum. Having performed this operation, it is generally requisite to inject mild tepid fluids in order to procure the full evacuation of the matter, which has often become more or less consistent.

If inflammatory symptoms either continue or return, after the perforation of the tympanum, antiphlogistic measures should be directed; but if the discharge continue, the patient should sleep on the side on which the ear is affected, diluent and *emollient injections* being occasionally employed, so as to prevent any clogging of the meatus, and accumulation of matter in the middle ear. M. Itard directs, with this view, an injection formed of a drachm of caustic potash to the pint of rose-water. Light tonics and mild laxatives, with change of air, ought also to be prescribed, so as to prevent the disease from degenerating into the ulcerative and chronic states.

29. ii. Of Chronic Otitis. — When otorrhœa becomes established after acute otitis, as above, or follows a slight or imperceptible state of inflammatory irritation, the treatment may be divided into the local, and general, — the latter more especially being directed against the state of constitutional disorder. *Local depletion* is required only early in those cases which present more of a sub-acute character, or when this, or even acute symptoms supervene from obstruction to the discharge, or any other cause. *Blisters* behind the ear, stretching to the occiput, or on the nape of the neck, and either kept discharging or repeated, are often very serviceable. M. Andral notices *setons*, or cautery of the nucha, or issues in the extremities. M. Itard directs, in addition, the head to be shaved, rubbed assiduously with stimulating substances, and kept constantly covered with a gummed silk cap. He very judiciously forbids the use of any other than simply *diluent or emollient injections*. Even gently astringent fluids ought not to be resorted to until the discharge begins to diminish; if its diminution be not attended by any aggravation of the local or constitutional symptoms. In this case, the mildest *astringents* may be commenced with, and those which are more and more active successively employed. A weak infusion of roses, or of chamomile flowers, may be first prescribed, and subsequently a weak solution of the sulphate of zinc, or of *kreosote* in distilled water. Oily injections, in cases of otorrhœa, should not be used, as the oil speedily becomes rancid when any part of it remains in the ear. Whenever the discharge is suddenly suppressed, means should be taken to restore it. Warm bread and water *poultices or fomentations*, frequently renewed, may be resorted to with this intention. M. Itard directs bread warm from the oven, and deprived of its crust, to be applied every three hours, and an injection of a solution consisting of three grains of corrosive sublimate in eight ounces of water. Care should also be taken to remove any obstruction that may present itself in the meatus. If the suppression be attended by the accession of acute symptoms, leeches must be applied; but the powers of life ought not to be much reduced by these or any other means. Mercury in this state of disease is injurious. If matter form in the vicinity of the mastoid process, an early outlet should be given to it by a free *incision* down to the carious bone, and the powers of life supported by *gentle tonics*, light nutritious diet, and change to a healthy air. When caries is obviously present, and there is no increase of sensibility, or any other symptom of acute inflammatory action, M. Andral advises injections of a strong solution of potash to be frequently thrown into the ear. When, however, there is evidence of the caries having induced disease within the head, the simply diluent injections should only be used, in order to prevent any interruption to the discharge.

30. By the constant use of simple diluent or *emollient injections* — of warm water, or milk and water merely—and careful attention to the general health, the disease may be kept stationary, from youth to old age, although it may not be cured. In scrofulous and lymphatic subjects, the *bitter tonics*; the infusion or decoction of bark; the *kreòsote* internally; the preparations of *iodine* in gentle doses; the *ioduret of iron*, or the ammoniated or tartarized *iron*; and mild purgatives, once or twice a week; will be extremely serviceable, if there be no acute symptoms, or febrile action. I have also seen much benefit accrue from *sulphur* given daily in sufficient quantity to keep the bowels freely open. If the disease seems connected with a syphilitic taint, or has come on after syphilitic sore-throat, or an inefficient course of mercury, the *oxymuriate* of mercury should be given in gentle tonics, or with a course of *sarsaparilla*. Where there is fever, with a loaded tongue, or pain in the head and ear; in addition to those appropriate local means above stated, (§ 28.), a course of mild and cooling *purgatives* or aperients, external derivatives, diaphoretics, and a mild farinaceous diet, should be employed. Change of air, and such mineral waters as may suit the peculiarities of the case — the chalybeate, aërated, and sulphureous, in cases devoid of fever and other acute symptoms; the aperient and refrigerant in those thus accompanied — will be very powerful adjuvants. (See *Art.* Hearing.)

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ECLAMPSIA. See Convulsions (§ 24. 27.).

ECSTASY. See Cataleptic Ecstasy, &c.

ECTHYMA. Syn.—Ἔκθυμα (from ἐκθύω, I break forth), Willan. Τέρμινθος, *terebinthus* of the Greeks, according to Hoffmann; or Ἐρέβινθος, *Cicer.*, as it is read by others with more reason, Turner; also Επινυκτις (from ἐπι and νῦξ), owing to its appearing or being aggravated at night, according to Celsus, Galen, Paulus, and Aëtius. *Terminthus*, Wiseman, Turner, &c. *Phlysis Ecthyma*, Young. *Ecpyesis Ecthyma*, Good. *Psydracia*, J. P. Frank, Chiarurgi, and J. Frank. *Phlyzacion*, Paget. *Dartre Crus-*

tacée, Furoncle Atonique, Fr. *Erbsenblattern, Eiternde Flechte,* Germ. *Papulous Scall.*

CLASSIF. — 5. *Order,* Pustular Eruptions (*Willan*). 6. *Class,* Dis. of Excernent Functions; 3. *Order,* Affecting the Skin (*Good*). III. CLASS, I. ORDER (*Author, in Preface*).

1. DEFIN. — *An eruption of large, round, and distinct pustules, seated on a hard, elevated, red base, and terminating in a thick, hard, and dark-coloured scab, leaving a livid spot or superficial cicatrix; not contagious.*

2. I. DESCRIPTION.—These pustules are always discrete, scattered sparingly, and appear successively in different parts of the body; and rarely terminate in ulceration or tuberculous induration. They may appear in any part of the body; but they are most frequently observed on the limbs, abdomen, shoulders, breast, and neck — rarely in the face or scalp. They present modified states, according to the causes, the age of the patient, and the severity of the eruption. These WILLAN has arranged into, *Ecthyma Vulgare, E. Infantilis, E. luridum,* and *E. Cachecticum.* To these may be added the *Ecthyma Syphiliticum* (FRANK, BIETT, CAZENAVE, SCHEDEL, TODD, &c.), the syphilitic affection sometimes assuming the ecthymatous form. M. RAYER has adopted a simpler and more correct division, *viz.* into the *Acute* and *Chronic,* which I shall here follow.

3. i. ACUTE ECTHYMA; *E. Vulgare,* WILLAN.—In its simpler and rarer form, ecthyma appears in some one part of the body, most frequently on the neck and shoulders, in the form of circumscribed reddish elevations, firm to the touch, and distant from each other. Pus soon is formed at the summit of these elevations; and the pustules are completely developed in three or four days; their bases being much inflamed, elevated, large, hard, and circular, — of a bright red in young persons, and of a livid red in the aged. Their suppurating summits generally break in one or two days after their formation; the purulent matter giving rise to a brownish, or greenish, and very adherent scab. After one or two weeks, the scabs are detached, and leave a livid red mark, or occasionally very superficial cicatrices, of the size of those of small-pox, but much less deep. The eruption of the pustules is attended with stinging pains in them; sometimes with tumefaction of the adjoining lymphatic glands, and is often preceded or accompanied by chronic inflammation of the digestive mucous surface, which may continue after the healing of the pustules. This variety is seldom attended by fever.

4. ii. CHRONIC ECTHYMA is much more frequent than the preceding, and always consists of several successive eruptions on the limbs, neck, breast, &c., at periods more or less distant. The pustules present the same characters, and follow individually, and independently of each other, the same course as above described; some making their appearance whilst others are suppurating, or even healing. During several months, divers eruptions are thus formed. Besides the successive eruptions, the pustules themselves may be more chronic, their bases assuming large dimensions, approaching those of boils, and being tense and prominent. In these cases, the subjacent cellular tissue is inflamed, their areolæ becoming hard and violet-coloured — *Ecthyma luridum* of WILLAN. Their summits break in eight or ten days, and discharge a little sanious or bloody matter, sometimes ulcerate slightly, and are covered by hard and black crusts or scabs, which adhere firmly, and are surrounded by livid red areolæ, which sometimes remain after the crusts have fallen off; this taking place in the course of a few weeks; leaving dark red spots, or livid cicatrices, after them. If the scabs are torn away before the period at which they usually fall off, small indolent ulcers, with callous borders, giving issue to a sanious fluid, are often produced. When the pustules remain long stationary without ulcerating, they are occasionally followed by violet-coloured tubercles, which may ultimately suppurate or ulcerate, and more deeply mark the skin. A *symptomatic* form of this eruption, which is often tedious and severe, sometimes attends the cachexia consequent on measles and other eruptive fevers; but it differs in nothing from the disease now described, excepting in the number of the pustules, and the marked constitutional disorder.

5. The successive eruptions characterising this variety are observed chiefly in feeble and ill fed children — (*Ecthyma Infantile* of WILLAN). — When the number of pustules is small, and the successive eruptions are distant from each other, there is generally little or no fever. But when the pustules are numerous, their bases very large and much inflamed, or if they ulcerate, there is usually present a co-ordinate degree of fever — *Ecthyma Febrile, E. Cachecticum.*—The febrile symptoms sometimes precede, and at other times accompany, the severer forms of the eruption, particularly in unhealthy and aged persons; and are also attended by gastric and intestinal disorder, —by anorexia, pain at the epigastrium, irregularity or constipation of the bowels, a morbid appearance of the tongue, gums, and fauces, and of the evacuations, headach, pains in the limbs, lassitude, and by great depression of spirits,— with heat, stinging, tingling, or itching in the pustules. In such cases, as well as in other chronic states, this eruption is often *complicated* with swellings of the lymphatic glands, with inflammation of the conjunctiva, or of the fauces, or of the pharynx; with œdema of the lower extremities; and with other cutaneous eruptions, especially with rupia and furunculus. It is also frequently associated with, or rather symptomatic of, chronic inflammation of the digestive or respiratory mucous surfaces, and biliary derangement. The *duration* of chronic ecthyma is always subordinate to the successive eruptions of pustules, to the habit and constitution of the patient, and the treatment employed. It is usually from two to four months; but it may be longer or shorter.

6. When syphilitic disease gives rise to eruptions with the characters of ecthyma — *E. Syphiliticum; Fsydracia Venerea,* J. FRANK; *Syphilide pustuleuse Phlyzacie,* BIETT, RAYER, &c.; *Pustular Venereal Disease,* CARMICHAEL — the pustules are always surrounded by broad, dark, copper-coloured areolæ, and are very large, indolent, and inclined to ulcerate. The ulcerations, when the scabs are detached, are deep, greyish or pale, unhealthy, with abrupt and violet-coloured edges; but they seldom extend, the scabs gradually reforming over them, and being successively detached, until they heal under appro-

priate treatment, leaving permanent, round, copper-coloured cicatrices. This form of the syphilitic eruption is most common in children born with the infection, the pustules being numerous, flat, and sometimes oval, followed by ulcerations; the skin foul and dingy; and the body emaciated (CAZENAVE and SCHEDEL).

7. II. DIAGNOSIS.— The pustules of ecthyma are easily recognised, by their form, their size, their inflamed base, and mode of developement; and distinguished from those of acne, of impetigo, mentagra, or porrigo. — *a*. However, when the pustules of *mentagra* or of *acne* present, as they occasionally do, hardened red bases, they may be mistaken for the *phlyzacious* pustules of ecthyma, if the induration, rather than the inflammation, were attended to; but the specific characters of these eruptions are sufficiently distinct. — *b*. The umbilicated pustules of *small-pox*, the multilocular pustules of *vaccinia*, independently of their contagious properties, cannot be mistaken for those of ecthyma. — *c*. The inflammation in *furunculus* begins in the sub-cutaneous cellular tissue, and extends outwards; in ecthyma, it commences in the skin, and proceeds inwards; the former being either single, or much less numerous, and much larger. — *d*. *Rupia* sometimes is coëtaneous with ecthyma, in its chronic form — *E. luridum* and *Cachecticum;* the latter seeming to be converted into, or appearing to be an earlier stage or less severe grade of, the former, more especially in cachectic children, as correctly alluded to by Mr. DENDY, whose experience in cutaneous diseases, as my colleague at the Infirmary for Children, has been most extensive. But the early stages of both will sufficiently distinguish them from each other, independently of the prominent and thick crusts, with the deep ulcerations, characterising rupia. — *e*. The *itch* presents only a few analogies with ecthyma, when it is complicated with, or when its vesicles are accidentally transformed into, pustules. In ecthyma, the pustules are rarely numerous; they appear successively, the course of each being independent of the rest. But in itch, the accidental pustules form on the most inflamed points; are always intermixed with the small vesicles, by which it is characterised; are more agglomerated than in ecthyma; are seated chiefly on the hands, between the fingers, especially between the thumb and forefinger; and are attended by itching; whilst the pustules of ecthyma produce a stinging pain: the itch, moreover, being vesicular and contagious.

8. III. CAUSES.— Ecthyma attacks all ages and constitutions; but it is most common in adults of a sanguineous temperament and bad habit of body; or in persons who have prematurely exhausted the powers of the digestive organs, and vital energies of the system generally. It occurs at all seasons; but is most frequent in spring and summer. Unwholesome and insufficient nourishment; cold and moist habitations; want of personal cleanliness, especially among those who wear foul woollen next the skin, or who are scantily clothed; and the irritation of various mineral and pulverulent substances; are its most common causes. Hence it is prevalent chiefly among the poor, and mechanics (*Psydracia Artificum*, J. FRANK), whose occupations subject them to those contingencies. Great fatigue, prolonged watching, anxiety or distress of mind, inattention to the states of the stomach and bowels, and whatever lowers the digestive and assimilating powers, and energies of life, inducing general cachexia, will occasion this form of eruption. The *chronic states* of the eruption are most frequent in the indigent; in persons living on stale smoked or salted provisions; or whose constitutions are broken down by imprudence, misfortune, drunkenness, age, and irregularities; or in ill-nourished and debilitated children, living in low, damp, dark, and close cellars, &c. Ecthyma often also follows small-pox, the itch, scarlatina, measles, the bites of leeches, and the application of irritating plasters or unguents. The tartarized antimonial ointment produces pustules of this kind. It may be symptomatic of pregnancy, and of several diseases of internal organs, especially of the prima via. Indeed, it may be in most instances considered as one of those infinitely diversified expressions of morbid action on the external surface, attendant upon prolonged disorder of the digestive and assimilative organs. Hence it cannot be a matter of surprise to find it sometimes associated with other chronic diseases of the skin. From the foregoing it follows that this eruption is dependent upon the general state of the system, to which our treatment should be chiefly directed in all its forms. This state is evidently one of debility, accompanied frequently with erethism, or morbid irritability, and essentially with altered sensibility and deficient tone of the vascular ramifications in the cuticular and sub-cuticular tissues.

9. IV. TREATMENT. — *A*. In the *Acute form*, when the pustules are few, little more is requisite than a mild diet, tepid baths, cooling aperients, and two or three grains of hydrarg. cum creta with dried sub-carbonate of soda or potash, at bed-time. Whey is the best beverage; and, if the patient be robust and the pustules numerous, a small bleeding, or leeches to the anus (CAZENAVE, &c.), may be resorted to. If the stools be morbid, the soda tartarizata, or the soluble tartar, should be given with infusion of senna, and afterwards the compound infusion of roses may be taken with small doses of either of the sulphates; or these latter may be taken in tonic infusions, with the addition of a little dilute sulphuric acid.

10. *B*. The *Chronic states* generally require gentle tonics, with alteratives, and light nourishing diet. — *a*. When they occur in *infants*, the nurse should either be changed, or the treatment directed chiefly to her. Where this cannot be done, asses' or goats' milk should be substituted or given in addition; and the regimen strictly regulated. Change of air, warm salt water bathing or sponging, and gentle alteratives, will also greatly assist the cure. Hydrarg. cum creta, and the sub-carbonate of soda or potassa at night; the liquor potassæ in tonic infusions twice a day, and an occasional purgative in the morning; small doses of the chloruret of potash, or of the hydriodate of potash; warm salt-water bathing, and afterwards the ferrum tartarizatum; have been the most efficacious remedies, in these states, in my practice among *children*. The chlorate of potassa, and the other chlorates, were first employed by me, in this disease, many years ago, at the Infirmary for Children.

11. *b*. In grown up or aged persons, we should

always suspect disorder of the digestive and assimilating functions; and, if there be little or no fever, have recourse to deobstruent alteratives, as PLUMMER's pill, with soap, or taraxacum, at night; a stomachic purgative every second or third morning, and the decoction of sarsaparilla; or mild tonic infusions with soda or potash, in the course of the day. If we suspect congestion of the liver, or find tenderness of the stomach on pressure, small local depletions should be employed, and repeated according to circumstances, whilst the above depurating and mildly tonic remedies are continued. Mercurials should not be given in large doses. PLUMMER's pill, blue pill, or hydrarg. cum creta, with taraxacum, inspissated ox-gall, guaiacum, and sarsaparilla, are the most beneficial. The occasional exhibition of purgatives, or the association of them with tonics, is also necessary, especially if the stools be morbid, and the abdominal viscera require to be excited. In such cases, a prolonged course of tonic or stomachic purgatives is often necessary.

12. *c.* When the cachectic state is complicated with some degree of febrile action (§ 5.), the mild mercurials now particularised should be conjoined with James's or Dover's powder; and saline diaphoretics exhibited at short intervals; the morbid secretions and fæcal accumulations being evacuated from time to time, by cooling purgatives. If there be tenderness at the epigastrium, a few leeches applied there will materially assist these remedies. After these, the infusion or decoction of cinchona with liquor ammoniæ acetatis, or with the pyroligneous acid, or with nitrate of potash and sub-carbonate of soda; a course of tonic infusions, with alkalies and the extract of taraxacum; tepid or warm bathing; the mineral acids with anodynes; and the other means particularised in the last paragraph; may severally be exhibited. Having removed fever, and evacuated morbid matters, more active tonics, as the quinine in the compound infusion of roses, with tinctura opii; the decoctum cinchonæ with the mineral acids, or with camphor and ammonia; chalybeate preparations, sarsaparilla and guaiacum, the balsams and terebinthinates with magnesia, common tar made into pills with this absorbent, the bark of the *madar* root, &c., may be prescribed.

13. *d.* The *syphilitic form* of ecthyma should be treated in the manner described in the article ACNE (§ 30.). Mr. CARMICHAEL does not consider this eruption as being truly syphilitic, and therefore confides chiefly in sarsaparilla with antimonials and guaiacum. In a case of this form of syphilitic eruption, lately attended by my friend Mr. C. HUTCHISON and myself, oxymuriate of mercury, given in sarsaparilla, was required for its cure, milder means not having succeeded. Dr. A. T. THOMSON advises this preparation in minute doses to be given in the decoction of elm-bark, or in the emulsion of bitter almonds. In the cases of infants, some French physicians recommend the milk of a goat on which mercurial ointment has been rubbed. When the child is at the breast, the nurse should enter upon a gentle course of the oxymuriate in the decoction of sarsaparilla, or in almond emulsion.

14. *e. External means* are sometimes required to remove the irritation attending the eruption, and to heal such as ulcerate. With these intentions, *tepid alkaline baths*; fomentations with a decoction of poppy-heads; a weak solution of the chlorurets of lime or of soda, especially when there is ulceration; or solutions of chlorine, or of sulphate of zinc with hydrocyanic acid, or of the nitro-muriatic acids, or of nitrate of silver, &c.; may severally be employed. Dr. A. T. THOMSON recommends the following:—

No. 209. ℞ Plumbi Acetatis ʒ ss.; Acidi Hydrocyanici ʒ iij.; Unguenti Cetacei ℥ iij. M. Fiat Unguentum partibus cutis nudis applicandum.

15. *f.* The *diet* in the *acute form* ought to be bland and farinaceous, whey and emollient fluids, or water with a little vinegar, being the chief beverages. — In the *chronic states*, light and nourishing food, if there be no fever, or after fever is removed, is always requisite. In the more cachectic cases, a small quantity of wine should also be allowed. The patient will always derive benefit from the internal use of tar-water, which may be taken as the common drink in these cases. This medicine, which was formerly so inordinately praised, and, owing to this circumstance, now so undeservedly neglected, is most serviceable in this and many other chronic affections of the skin. In addition to these, frequent tepid and warm baths, and subsequently salt-water bathing, exercise in the open air, change of air, mental recreation, warm and suitable clothing; regularity in eating, drinking, and sleeping; early rising, and a regular state of the bowels, are important adjuvants.

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ECZEMA. SYN. — *Eczemata* (from ἐκζεω, I effervesce). *Ecsesmata*, Blancard. *Hidroa*, Sauvages, Vogel. *Ecphlysis Eczema*, Good. *Cytisma Eczema*, Young. *Hydrargyria*, Alley. *Mercurial Lepra*, *Mercurial Disease*, Moriarty and Mathias. *Hitzblätterchen*, Germ. *Dartre Squameuse humide*, *Dartre Vive*, *Hydrargyrie*, Fr. *Heat Eruption*.

CLASSIF. — 6. *Order*, Vesicular Eruptions (*Willan*). 1. *Group*, Eczemata (*Alibert*). 6. *Class*, 3. *Order* (*Good*). III. CLASS, I. ORDER (*Author*).

1. DEFIN. — *An eruption of minute vesicles, uncontagious, crowded together, and terminating in the absorption of the fluid they contain, or in superficial excoriations, with more or less serous exudation, concreting into thin flakes or crusts.*

2. I. DESCRIPTION. — This eruption may be confined to a single part of the body, or it may attack several parts, or even the whole surface. It most frequently appears in the axilla, the insides of the thighs, the groins, hams, &c. When it is more general, it often extends over the backs

of the hands, the face, scalp, neck, and forearms. It often occurs on the scrotum and verge of the anus, on and around the nipples, and in the vulva. Eczema presents various *modifications*, distinguished by Dr. WILLAN into the *E. solare*, *E. impetiginodes*, and *E. rubrum*. MM. BIETT and RAYER have, I think more correctly, divided it into the ACUTE and CHRONIC — a division which I shall partially adopt.

3. i. ACUTE ECZEMA. — The eruption of the vesicles of this form is preceded and accompanied by a sensation of heat and tingling of the affected parts, aggravated to smarting on being exposed to heat — *A*. In its most *simple form* — *Eczema simplex* — the skin still preserves its natural colour; and the vesicles are very small, very crowded, and hardly inflamed at their bases. The serum which they contain is at first limpid, afterwards opaque, milky, or turbid; and is ultimately absorbed, or dried on the summit of the vesicles after their rupture. In this latter case, which is not frequent, small epidermic flakes, and minute crusts of the size of a pin's head, are observed. These are soon detached; and often, in the space of one or two weeks, no traces of the eruption remain. Such is the usual course of the slightest state of eczema, as when it follows the action of the sun's rays, or of topical irritants, &c. It occurs most commonly in young persons, particularly females; is attended by no fever; but is sometimes complicated with lichen, and with psora.

4. *B*. When the inflammation is more acute, the skin becomes red and shining, as in erythema or erysipelas, at the same time that it is covered by minute vesicles — *Eczema rubrum*, WILLAN. — It commonly appears about the parts provided with hair, as the organs of generation, the margin of the anus, bends of the arms, wrists, and neck; and is more frequent and much more severe than the foregoing. The vesicles are small, crowded, or confluent, transparent, slightly shining, surrounded by red areolæ, especially in young, plethoric, and strong persons. They remain limpid until they burst, — about the fifth or sixth day, — frequently giving issue to a milky or reddish serum; and are replaced by small, yellowish lamellæ or flakes. In the *slighter grades* of this variety, the fluid is often absorbed, and the cuticle forming the vesicle exfoliates; but in the *severer grades*, the contents of the vesicles, when they burst, irritate the already inflamed surface, occasioning superficial excoriations, with a more or less abundant exudation of serum, which ultimately lessens, becomes thicker, and at last concretes, forming, with the detached cuticle, thin lamellæ or crusts.

5. *C*. The vesicles of eczema may be associated with small psydracious pustules — *E. impetiginodes* of WILLAN. — The inflammation is then carried to its highest degree, is preceded by a sensation of tension in the affected part, of burning heat, or attended by smarting, and intense itching, and considerable tumefaction. The vesicles are confluent or agglomerated, — at first transparent, assuming, in three or four days, an opaline hue, and passing into a sero-puriform state, being moreover interspersed with psydracious pustules. They all discharge a fluid having a faint unpleasant odour, and irritating the parts with which it comes in contact.

6. *D*. — *a*. In the *simple acute Eczema* there is usually at first not much disorder beyond that of the affected part. But in the *E. rubrum* and *E. impetiginodes*, there is generally febrile action, the intensity of which is proportionate to the local irritation. Not infrequently the eruption is preceded by gastro-intestinal irritation or disorder, the symptoms of which are often very manifest both before and at the time of the eruption. The lymphatic glands in the vicinity of the eruption are often swelled and painful. This form of the disease is almost always consequent upon appreciable external causes (§ 15.). — *b*. Its *duration* is commonly from two to three weeks. But the simplest variety may be a week less, and the severest form a week longer; the affected parts not losing their red colour for a considerable time longer.

7. ii. CHRONIC ECZEMA — may present the three grades of *acute eczema* particularised above, — the *E. simplex*, *E. rubrum*, and *E. impetiginodes*, whatever may be the causes which produce them. — *a*. When the inflammation is aggravated after the breaking of the vesicles, it may be extended to the deeper layers of the skin, and even to the sub-cutaneous tissue. The skin becomes very painful, is excoriated, its cuticle fissured; and, when it is very much irritated, resembles a blistered surface in a state of suppuration — *the Dartre Squameuse humide* of ALIBERT — and constantly exudes an ichorous fluid, which resembles drops of dew, and is often so abundant as to penetrate all the linen wrapped around the part. It is chiefly when the eruption has reached this height, that it is attended with the most insupportable itchings. The skin is then so acutely inflamed as to be as red as carmine in some parts. Repose at night is impossible, unless at intervals, when the smarting, stinging, or itching subsides; but this symptom suddenly returns without any obvious cause; when scratching of the part, sometimes until blood is poured forth with the exuded serum, cannot be longer forborne.

8. *b*. After a time, varying from a few weeks to many months, the inflammation subsides. The exuded serum becomes less abundant, thickens, and forms into thin, soft, yellowish brown, and semitransparent crusts, but little adherent, often very large, leaving beneath them, when detached, an inflamed and a slightly moistened surface. These crusts form more slowly, become drier, &c.; and then, without any obvious cause, the inflammation and the serous exudation resume their former intensity; or, when the healing process has proceeded further, the surface again becomes red, vesicles reform, break, and the affection follows the same course. Lastly, in some cases, no further exudation takes place: the crusts become drier, less yellow, and more adherent; often thickened, fissured, or chopped, and easily detached, leaving the surface but little inflamed. Sometimes, however, in the more extensively diffused state of the disease, the skin remains, even for several months, of a bright red; is covered in parts by dry and thin scales or flakes; and is in some places cracked, but without any perceptible exhalation. In this case, the eczema resembles certain scaly affections, especially *psoriasis*, — the more, as these scales arise, not as heretofore, from an exhalation and concretion of lymph, but are, as in the scaly eruptions, the lamellæ formed of diseased epidermis. In some cases, especially on the limbs, there remain but two or three small

places, the skin of which seems thin, stretched, shining, and smooth; its surface being covered by whitish and extremely thin scales, as if formed of epidermis, but without the least appearance of vesicles; the diagnosis being difficult, if the previous history, or the appearance of vesicles about the circumference of the excoriated part, did not render the nature of the eruption evident.

9. *c. Chronic Eczema,* although generally at first very limited, may extend over a wide surface, so as even to cover a whole limb, or the greater part of the body. — α. When it attacks the *face*, the redness and swelling, with œdema of the eyelids, are considerable; and sometimes associated with inflammation of the conjunctiva. — β. It occasionally is seen in the *ears,* especially when it affects the scalp, and is then often mistaken for a variety of porrigo, and it is sometimes associated with otorrhœa. — γ. When it attacks the *scalp*, it exudes a viscous fluid having a faint and nauseous odour. As it subsequently diminishes, it concretes into lamellated or furfuraceous crusts, which are easily detached. At last the secretion entirely subsides, the skin passing into a scaly state, and becoming the seat of an abundant and constant desquamation, the removal of the scales leaving the skin red, shining, and irritated. Eczema of the scalp may continue many months. It is generally attended by swelling of the posterior cervical lymphatic glands; and it occasions change or loss of the hair. — δ. When it is seated in the upper parts of the *thighs,* it often spreads to the anus, the scrotum, and to the vulva, occasioning, as indeed in its other severe forms, the most insupportable stinging and itching. If it extend to the penis, the prepuce is often fissured; painful itching, irritation, and erections, being caused by it. — ε. Eczema may be *complicated* with *lichen*, with *scabies*, with *impetigo*, and with *ecthyma*.

10. iii. SPECIFIC ECZEMA — *Mercurial Eczema, Mercurial Disease,* SCHREIBER, MORIARTY; *Hydrargyria,* ALLEY; *Exanthema Mercuriale,* J. FRANK — is, in its slighter grades, and as respects the characters of the eruption, in every respect the same as the acute and chronic *Eczema rubrum*. But the constitutional symptoms are much more severe, and the disturbance of the nervous system much greater, in the former than the latter; whilst the eruption is much more generally and more frequently diffused over the surface. Both in these lesser grades, and in the severer states about to be described, it is ushered in by much constitutional disturbance — especially furred tongue, accelerated circulation, and increased sensibility and irritability.

11. The more severe states of this affection were first described by BENJAMIN BELL, SPENS, MORIARTY, PEARSON, M'MULLIN, CHISHOLM, and ALLEY. Besides being preceded by a well-marked febrile paroxysm, these grades are often accompanied by difficult respiration, tightness across the chest, and dry cough, the skin being very hot, and the seat of a smarting and stinging sensation. When the disease is consequent on mercurial inunction — for it may also follow the internal use of mercurials — a diffused redness, with numerous crowded vesicles, supervenes in one or two days, generally on the thighs, scrotum, fore-arms, &c. In some cases, the eruption proceeds no further than the parts where frictions have been applied, and, after one or two weeks, subsides. But in the severer grades, the skin is extensively studded with vesicles, which soon break, discharging an irritating and offensive fluid, which concretes into large incrustations of a dark colour. At the same time the fauces, and frequently the conjunctiva, are greatly inflamed; and the face itself covered with incrustations, fissured in different directions. The eruption extends over a large space, and spreads in succession over most of the body; the excoriated surface being the seat of constant irritation, which is increased by the pressure of the body, and by the substances which imbibe the exuded fluid. The incrustations crack, and expose the raw surface in several places, upon change of posture. If the disease increase in severity, or be still more intense from the commencement, the attendant fever assumes a more adynamic form; diarrhœa is readily induced; the pain in the chest, and difficulty of breathing, increase, and are attended by anxiety at the præcordia; a dirty, bloody expectoration, indicating an analogous affection of the respiratory mucous surface, is observed; and ultimately, if relief be not obtained, the tongue and fauces become dry and dark, and the pulse frequent, small, feeble, and irregular. Sometimes sphacelation of the skin, with delirium or convulsions, takes place, and death ensues. — Such are the intense states of this disease, according to the physicians now referred to; but it more frequently assumes the milder grade described by Dr. BATEMAN; and which is characterised chiefly by a less severe and less extensive eruption and excoriation; by less remarkable constitutional disturbance, and by the entire absence, or the slight nature, of the pectoral symptoms.

12. The *duration* of this particular variety is very uncertain. When a limited part is affected, it may terminate in ten or twelve days; but when it is more universal and more severe, recovery seldom takes place in less than as many weeks, or even longer. The whole epidermis is destroyed by the more intense grades of the inflammation; and when the discharge ceases, it lies loose, and, with the concreted matter, assumes a pale brown colour, changing to black, before it falls off in large flakes. The red cuticle afterwards formed is liable, as in some other diseases, to desquamate again and again, even for a third or fourth time, but in smaller branny scales, of a light colour, a roughness long remaining like slight psoriasis. After the intenser forms, the nails and hair fall off; the former, when renewed, being thickened, furrowed, and incurvated.

13. II. DIAGNOSIS. — *a. Eczema simplex* may be mistaken for *scabies*, especially when affecting the wrist, and the sides of the fingers, or attended by much itching. But the vesicles of the former are flattened and agglomerated; those of the latter acuminated and isolated. The irritation or pruritus of eczema is rather a smarting or stinging; whilst that of scabies is rather agreeable than painful. Moreover, the latter is essentially contagious, the former is non-contagious. — *b. Eczema rubrum* may be mistaken for *miliaria*; but the vesicles of the latter are never confluent, as in the former; and are symptomatic of much constitutional disturbance, of which the eruption is a less important symptom than in eczema. — *c. E. impetiginodes* differs from *impetigo* in always occupying a large space, the latter being much more

confined. The pustules of impetigo have a larger base, and contain a thicker fluid, than this variety of eczema, which is always vesicular at its commencement, its secretion never consisting of true pus. Impetigo also gives rise to thicker, rougher, and more unequal crusts than it; and is never surrounded by the vesicles of eczema rubrum, as the E. impetiginodes always is.—*d*. Eczema, in its chronic state, may be confounded with *lichen agrius;* but the crusts formed by the latter are not so large, nor so thin, as the scales of the former; and when they fall off, they leave not a red, smooth, and shining surface; but a certain roughness, owing to the small prominent papulæ, which are generally evident to the eye, and always to the touch. Also, when lichen becomes dry and scaly, the skin is thicker, and more rugose, than in eczema; and there are commonly some papulæ scattered about, which, by their peculiar characters, further distinguish lichen.—*e*. The vesicles of the early stages, and their presence around the patches of excoriation in the latter periods, as well as the less dry and less friable scales of chronic eczema, will generally distinguish it from *psoriasis;* in which also the skin is more elevated or thickened, and more fissured in parts not influenced by the motions of the joints, than in any of the states of chronic eczema.

14. III. PROGNOSIS. — In its acute form, this affection is generally of no great importance: but in many of its chronic states, it often becomes most distressing; and sometimes even embitters existence; opposing, for many months, every known means of cure; and often returning after having been apparently altogether removed. When occasioned by mercury, especially if this mineral have been employed in large quantity, it may assume, as shown above, a most dangerous form; it therefore requires a guarded, and in some instances an unfavourable, prognosis, particularly when pectoral and nervous symptoms are present.

15. IV. CAUSES.—*a*. Eczema is most common in adults; is somewhat more frequent in females than in males; and oftener occurs in spring and summer, than in winter. Susceptibility of frame seems to dispose to it; and there appears to be a predisposition in some constitutions, generally connected with vascular plethora, favouring its passage into a severe and chronic form.—*b*. It is most frequently *excited* by solar or artificial heat; by the contact of either mineral, vegetable, or animal irritants,—especially the oxides of the metals; by mineral or other powders; by lime, alkalies, dust, and want of cleanliness; by sugar, &c. I have seen it produced on the insides of the thighs and parts adjoining, by the contact of the leucorrhœal discharge, and by the catamenial fluid. Draughts of cold water when the body is overheated, acid, acid fruits, pickles, and shell-fish, will also occasion it, especially in some constitutions. Blisters and plasters, and rancid oils or grease applied to the surface, are also among its usual causes. It sometimes, however, appears without any obvious reason; at other times, it seems attributable to indigestible and unwholesome food, to spirituous liquors, and similar errors in diet; it being, in such cases, most obstinate. It is not contagious: but M. BIETT supposes that it may be communicated in some cases, as when the exudation continues in contact with a healthy surface. He states, that he has seen it transmitted from, and to, the organs of generation, by sexual intercourse. The *specific form* is always caused by the use of mercurials—internal or external—but most frequently the latter; and by exposure to cold during their influence. Whether or not the eruption, in such cases, may be in some measure produced by a change in the fatty substance used in oxydizing the metal, is very difficult to determine.

16. V. TREATMENT.—The remedies recommended by WILLAN and BATEMAN, viz. heating tonics and acids, I have found more generally injurious than beneficial. The treatment directed by BIETT in his clinical lectures at the "*Hôpital Saint Louis*," and by his pupils, RAYER, CAZENAVE, and SCHEDEL, in their works, is decidedly more rational and successful.—*A*. The *slighter grades* of the acute disease are readily removed by simple *refrigerants* and *emollient* diluents, with cooling aperients, and tepid bathing. But when the eruption is more extended, is accompanied by smarting, or assumes the form of the *Eczema rubrum* or *E. impetiginodes*, *tepid alkaline* or *sulphuretted baths*—made by adding from four to eight ounces of the sub-carbonate of soda or of potash to the water of a whole bath, for an adult; or four ounces of the sulphuret of potash;—an antiphlogistic regimen; general *blood-letting* in young plethoric or robust persons; *local bleedings* in the vicinity of the excoriations; and small doses of the *nitrate of potash*, with *soda*, in mucilaginous diluents; will be required in addition to the above more gentle means. Emollient and *soothing applications* should also be resorted to. I agree with Mr. PLUMBE, in avoiding all greasy applications; and with M. BIETT, in forbidding the use of sulphur, or repeated doses of mercury, in this state of the disease; an antiphlogistic and soothing treatment being in every respect the most appropriate. I have prescribed with much benefit the *sub-borate of soda*, with or without the nitrate of potash, in emollients, in the acute form; and after the bowels have been evacuated, the *nitrate of soda* in similar vehicles. In all cases, the exciting causes should be ascertained and removed.

17. *B*. In the *chronic states* of this eruption, the antiphlogistic treatment recommended above should be employed, where it has been either neglected, or insufficiently tried. *Purgatives* also ought to be frequently resorted to, where the tongue is loaded and the evacuations unnatural, and repeated daily until they assume a healthy hue. For this purpose a mercurial preparation may be exhibited at night, and a purgative draught in the morning. If there be signs of asthenia and a cachectic state of the frame, the purgative should be of a tonic and stomachic kind; the bark of the *madar root*, or *tonic infusions*, with the nitrate of potash, or with the mineral acids, being taken through the day, but not until mercurial medicines have been relinquished. Dr. ELLIOTSON advises, in addition to bleeding and a low diet, the exhibition of mercury until the mouth is affected; but the latter part of this practice does not agree with my experience; the former I have always directed. It is chiefly when the excoriations are extensive, and the exudation copious, and after depletions have been employed, that *acids* seem to be indicated; morbid secretions having been

evacuated from the *prima via.* The infusion of roses, with sulphuric acid and small doses of the sulphate of potash, or of quinine, or the infusion of cinchona with nitrate of potash, nitric acid, and the spiritus ætheris nitrici, is most conformable to the treatment advised by other writers; but I have seen more benefit accrue from the decoction or *infusion of bark*, with nitrate of potash and sub-carbonate of soda; from the compound decoction of *sarsaparilla* (the mezereon having been omitted in its preparation) with liquor potassæ; and from the decoction of *dulcamara*, or of *elm bark*, with very minute quantities of the oxymuriate of mercury, than from mineral acids. I have found Fowler's arsenical solution of service in some very chronic cases, but the affection often returned. It is requisite, in inveterate cases, that the diet should be strictly regulated, and confined chiefly to farinaceous food, and broth, with emollient diluents, in order to derive lasting advantage from any plan of treatment.

18. *a. External means* are especially requisite in most chronic states of the complaint. In addition to those directed above, poultices or cold cream with a solution of the acetate of lead, or lint moistened in a dilute solution of this substance, may be applied to the excoriated parts. When smarting and stinging are great, Dr. A. T. Thomson recommends them to be washed with a mixture of a drachm of hydrocyanic acid in eight ounces of the emulsion of bitter almonds. M. Guillemineau advises the application of a solution of the nitrate of silver. When the excoriations are extensive, and the exudation copious, the *linimentum calcis*, either alone, or with a little of the linimentum camphoræ, will be very serviceable. The external use of *camphor*, in all such cases, is productive of advantage. Much benefit will often accrue from vapour baths, from tepid and warm alkaline, or sulphuretted baths; and, in the more chronic cases, from sulphureous fumigating baths: but this result will seldom be obtained—more particularly in plethoric and robust persons—until after morbid secretions have been fully evacuated, and bloodletting has been carried as far as circumstances will permit. Indeed, any of the numerous applications or combinations of *moist heat*, in the treatment of acute or sub-acute eruptive diseases, is more or less injurious, unless preceded by these measures. —When the eruption passes into a scaly and indolent state, some writers have prescribed *blisters*, or an ointment with the red precipitate, with the view of exciting a new action in the part; but these and simlar means are inferior to the baths mentioned above. Ointments with the *proto-ioduret* (℈ j. to ℥ j.) or the *deuto-ioduret* (gr. x. to ℥ j.) *of mercury*, promise, however, greater benefit. When the disease has been of long duration, the arrest of it should not be risked, unless with the precautions of occasional vascular depletions, alvine evacuations, and the insertion of either an issue or seton, otherwise internal disorder may supervene, or the eruption return,—illustrations of both these results having come before me in practice.

19. *b. Mercurial eczema* requires, according to the grade it assumes, a nearly similar treatment to the above. Biett judiciously prescribes *bloodletting* at the outset; Pearson, *diaphoretics*; and Bateman, frequent *warm baths*, with diaphoretics and opiates; and subsequently tonics and mineral acids. Dr. Moriarty, however, found opium to be a somewhat doubtful remedy. Mercury ought to be immediately relinquished, and a return to it either avoided, or ventured on with caution. When the symptoms are severe, and the attendant fever of an adynamic kind, *camphor*, *ammonia*, the *liquor ammoniæ acetatis*, or *pyroligneous acid*, or the *chlorates*, are the most appropriate remedies. Either of these should be associated with such other substances as may be appropriate to the circumstances of the case; and, when the discharge from the excoriated surface is either abundant or offensive, employed *externally* as well as internally; the strength of the patient being supported by appropriate means.

20. *c.* When *convalescence* from either of the states of the complaint is advanced, change of air, regular exercise, avoiding the ingestion of cold fluids when the surface is warm; a spare, light, and regular diet, with the occasional use of deobstruent or sulphuretted mineral waters; will generally tend to confirm the recovery.

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EDUCATION, PHYSICAL.—This subject is fully treated of in the article Age, where measures for the healthy developement of the organs and tissues, and for strengthening the constitution, are succinctly stated in connection with the epochs of early life in which they should be adopted (see Age, § 5—28.). In the article Disease, the numerous causes which impede, counteract, or entirely subvert, physical developement and strength are described, and their mode of operation explained (see Disease, § 11—62.); and in the article on Infants, various observations not comprised under the foregoing heads are adduced.

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ELEPHANTIASIS OF THE ARABIANS.

Syn.—Elephantia, *Elephantiasis Arabum*, Auct. Var. *Hernia Carnosa*, Prosper Alpinus. *Glandular Disease of Barbadoes*, Hendy. *Barbadoes Leg. Cochin Leg. Egyptian Sarcocele*, Larrey. *Bucnemia Tropica*, Good. *Elephantiasis tuberosa*, and *Scrotalis*, Alibert. *Oelschenkel*, *Drusenkrankheit*, Germ. *Lèpre tuberculeuse éléphantine*, Fr. *Dal Fil*, Arab. *Elephant Leg*, *Elephant Disease*.

Classif.—7. *Order*, Tubercular Affections (*Bateman*). 6. *Group*, Leprous Affections (*Alibert*). 3. *Class*, 2. *Order* (*Good*). IV. Class, IV. Order (*Author*).

1. Defin. — *Hardness, lividity, and great tumefaction of one or both limbs, or of the scrotum, &c., with an irregular glabrous, or scaly state of the skin; endemic chiefly in warm countries.*

2. Although this disease was first described by Rhazes, it has been very generally confounded, in modern times, with the elephantiasis of the Greeks, from which it is quite distinct. Its resemblance, even, to the latter affection, does not sufficiently justify M. Alibert in arranging it under the same genus. It is *seated* most frequently in the lower extremities, but is also met with in the upper extremities, in the scrotum, the vulva, the breasts, and more rarely in other parts of the body. The *countries* in which it is most common are, Barbadoes, and all the West India Islands; various parts of South America; Egypt, and several parts of inter-tropical Africa; Ceylon, the neighbourhood of Cochin on the coast of Malabar, and other parts of Hindostan; Japan, and some districts of China; the Polynesian isles; and the provinces of Asturias and Castile, in Spain. Cases, however, occasionally occur in all the countries of Europe. According to Dr. Graves and Dr. Evanson, a variety of it is common in Ireland. I have seen one case in the Infirmary at Edinburgh; five in London, one of them very recently under the care of Mr. Morley; and several, many years ago, in Africa, and on the Continent of Europe.

3. I. Causes. — *a*. The *predisposing causes* are not sufficiently known. It appears not to have been a very old disease in the West Indies, where it seldom occurs in Europeans. It is most frequent in Creoles and in imported Africans, and in places near the sea-coast. In the East Indies, it attacks only the natives. It seems in some instances hereditary, and in others derived from the habits or circumstances of the individual. — *b*. The *exciting causes* are also obscure. Hillary and Hendy attribute it to sudden vicissitudes of temperature. It has been considered that the use of fermented beverages, especially those prepared in warm climates from the sap of several species of palm, occasions it, as acid wines give rise to gout, with swelling of the extremities, in this country. The remarkable case of it in both lower extremities, under the care of Mr. Morley, is that of a man in good circumstances, who has lived well, and resided constantly in London.

4. II. Symptoms and Progress. — The disease often commences without any premonitory signs; the patient experiencing rigors or chills, with nausea, headache, and intense fever, followed or attended by acute and burning pain, extending in the course of the lymphatics. Subsequently a tense, knotted, and hard chord, very painful to the touch, may be traced to enlarged glands in the groin or armpits. The surface of the part is soon affected by an erysipelatous inflammation, attended by a burning and smarting sensation, and by great tumefaction; the cellular tissue being implicated as well as the skin, which presents no appearance of vesication. These local symptoms are accompanied by fever, ardent thirst, burning heat of surface, &c., alternating with copious perspirations. All these symptoms are diminished in the course of two or three days, and, excepting the tumefaction, disappear in a short time; but they return again after irregular intervals, each successive attack leaving the limb more tumefied and hard, until the disease reaches that pitch to which the term elephantiasis has generally been applied. After each of these seizures, the redness of the surface, and particularly that in the course of the absorbents, disappears; but the part at last becomes irregular, altered in colour, sometimes fissured or cracked, hard and elastic, pressure leaving no impression after it. The progress of alteration varies extremely — from a few months to many years. Sometimes the disease remains stationary for several years, and without any return of the attacks now described. The cutaneous surface is occasionally pale, more frequently yellowish, of a dirty hue or livid. It is often also scaly, resembling icthyosis, rugose, or fissured; is in some instances covered with soft vegetations; or with hard, horny excrescences; and is more rarely ulcerated. In other cases, the surface is traversed by enlarged veins; and very frequently enlarged or varicose veins are seen ramifying from the seat of enlargement, — a circumstance which evidently induced the Arabian physicians to notice this affection in connection with, and indeed as depending upon, a varicose state of these vessels. At a far advanced period, the hard and engorged glands sometimes suppurate, or even sphacelate; and more rarely, indolent abscesses, or deep-seated suppuration, with offensive discharges, supervene in the midst of the enlarged mass. When the disease is seated in the *scrotum*, this part often becomes very remarkably enlarged. In Egypt and the East, tumours of this description are not infrequent, and sometimes weigh from 30 to 80 lbs. Several of these have been removed in Egypt by Clot-Bey. One of enormous size was lately operated upon in London, but unsuccessfully. M. Dupuytren met with an instance of this alteration in the labia majora vulvæ.

5. III. Pathology. — i. On *dissection*, the integuments of the part are found thickened and hardened:—1st. The epidermis is very thick, adherent, and fissured;—2d. The mucous layer is very distinct;—3d. The papillary body is greatly developed, and readily distinguished from the cutis vera or dermis, the papillæ being elongated, enlarged, and prominent (Andral, Chevalier); — 4th. The cutis vera is much thickened, it sometimes being half an inch in thickness; — 5th. The sub-cutaneous cellular tissue is either thickened, the cellular areolæ containing a semiliquid, gela-

tinous matter; or it is hardened, presenting an intermediate state between a lardaceous and a scirrhous structure, and is more and more dense as it approaches the skin. The muscles underneath are pale, thin, or softened. The lymphatic glands and vessels present evidence of disease, but not uniformly; and one or more of the principal veins are generally obstructed or obliterated, as observed in the cases inspected by MM. BOUILLAUD and GAIDE.

6. ii. *Nature, &c.* — The structural alterations to which elephantiasis is strictly applicable, are evidently remote effects of various states of morbid action, which have either repeatedly returned, or have long continued in the diseased part. From the history of cases, and the changes observed on dissection, the skin, subjacent cellular tissue, the absorbents, and the veins, are evidently more or less implicated; but it is very difficult to ascertain which of these is primarily or chiefly affected. The principal characteristics of elephantiasis have manifestly resulted, in several instances, from disease of the absorbents, or veins, or both. They have also followed, within the scope of my own observation, a chronic affection of the skin, which has extended to the subjacent tissues, and, sooner or later, to either the veins or the absorbents, or perhaps to both. I was lately consulted by a female of middle age, who, during convalescence from a dangerous attack of continued fever, more than ten years previously, experienced hard and painful swelling of one of the lower extremities, depending on disease of the absorbents or veins, or both, according to the account she gave. When I saw her, the limb, below the knee, was very hard, and enormously swollen; and had all the characters of elephant leg; the skin being irregular, scabrous, livid, and fissured. I directed bandages, and the internal use of iodine; but after two or three visits, I saw no more of her, and consequently know nothing of the result. Some time previously, a similar case, as respects its origin and history, although not so severe, came before me. It had been of several years' duration; and had increased gradually after the acute attack in which it originated. The limb was hard, dark red, and livid in parts, somewhat irregular, slightly scaly, and the veins above the tumefied part enlarged. The affection of the skin was here consecutive. Considerable advantage was procured from bandaging, and the internal use of iodine; but the enlargement is not entirely removed. The patient is still under my occasional observation. More than one of the cases I saw in Africa, seemed, on the other hand, to originate in a very manifest alteration of the cutaneous surface.

7. M. ALARD considers elephantiasis essentially to depend upon inflammation of the cutaneous and sub-cutaneous absorbing vessels and lymphatics. Dr. MUSGRAVE also views it, as it occurs in the West Indies, as a consequence of inflammation of the lymphatics, the inflammation being accompanied with pungent heat, and with redness of the skin, and characterised by great tendency to metastasis. He states, that it usually betrays itself in the scrotum, the mammæ, or in some part of the extremities, most frequently about the ancle, or high up the thigh; and, although at first circumscribed, it often diffuses itself over the limb. When the glands are not involved, painful and indurated chords can be traced to the nearest cluster; but, whatever may be its original seat, the patient is never secure, while the constitutional disturbance subsists, from a sudden retrocession to some vital organ. He has seen it translated from the scrotum to the head; from thence, after a few hours, descend rapidly to the abdomen; again migrate to the chest; and return, perhaps, to the encephalon, and prove fatal there; or resume its more harmless situation, and there run its course. While occupying an internal viscus, it gives rise to the usual symptoms of acute inflammation. Dr. HILLARY and Dr. MUSGRAVE view the local affection as a consequence of fever, which commonly precedes it for two days. Dr. HENDY, however, contends that the fever is symptomatic of the inflammation of the lymphatic vessels and glands. During the acute stage of the disease, either, perhaps, may precede the other; but it is most conformable with just views in pathology, to consider the local change as a consequence of the constitutional disorder; the advanced or chronic state being the result of repeated attacks of inflammation of the lymphatics or veins, and of the integuments, generally existing together, but often originating in, and continuing more or less confined to, either.

8. *Inferences.* — According to the descriptions furnished by TOWNE, HILLARY, HENDY, MUSGRAVE, BOUILLAUD, and GAIDE, and to my own observations, this disease should be viewed — (*a*) as consisting of certain *acute*, as well as far advanced or *chronic*, states, generally connected with a bad habit of body, and each requiring an appropriate method of cure; and, (*b*) as arising — *α*. most frequently from inflammation of the lymphatic system and skin, particularly in warm climates; *β*. from inflammation and obstruction of the veins, in some instances, with irritation of the skin in various grades at an advanced period; and, *γ*. from the extension of inflammation from the skin to the veins or lymphatics, in other cases. The tumefaction and hardness are necessary consequences of thickening of the *cutis vera* and sub-cutaneous tissue, with deposition of inspissated lymph in the areolæ of the latter, whether arising from chronic inflammation of these structures, or from inflammation and obstruction of the lymphatics or veins, or from both these species of alteration.

9. IV. *a.* The DIAGNOSIS of elephantiasis is very easy in the chronic and far advanced state. In the earlier stages, when commencing in either of the parts noticed above, it should be viewed as inflammation of that part, which, in countries where the disease is endemic, may be followed, if not properly treated, by the organic changes constituting its fully formed condition. When this takes place, the great tumefaction and hardness, and especially the circumstance of pressure not being followed by pitting, with the alterations already described (§ 4.), will sufficiently mark the nature of the disease. — *b.* The PROGNOSIS is unfavourable, as respects the removal of the disease, when it is fully formed, although relief may be obtained, and persons may live very many years with it. But it tends generally to shorten life, and always to render it much less comfortable. When it is not far advanced, it may be nearly or altogether removed by treatment. The result, however, will very much depend upon the

habit of body, and vigour of constitution, of the patient.

10. V. Treatment.—i. Rhazes and others of the Arabian physicians recommended, in the *Acute stage* of elephantiasis, general bleeding, emetics, aperients, confinement to the horizontal posture, and spare diet, with cooling epithems to the part, and subsequently bandages. A similar treatment is very generally adopted in the East; and I believe that it cannot be much improved upon. Dr. Musgrave advises, in addition to the local application of warmth, and to febrifuge and purgative medicines, the exhibition of mercury until the mouth is affected, in order to prevent the metastasis of the disease, which, in the West Indies, is so common and dangerous; as well as the deposition of lymph, to which the hardness and swelling are chiefly owing. The employment of a number of *leeches*, or *incisions*, as recommended by Mr. Copland Hutchison in erysipelas, followed by poultices, or other emollient applications, may also be resorted to with advantage at this period.

11. ii. In *the Chronic stage*, the above treatment will seldom be productive of benefit. M. Rayer, however, states, that general *bleeding* will be of service when the constitutional powers are not much impaired; and M. Lisfranc advises *scarifications*, local bleedings, and *compression*. Bandages, and *frictions* with various resolvent substances, are more to be depended upon in the most chronic cases, and where the vital energies are too far depressed to admit of depletions. But even in these, active *purging* is indispensable. M. Alard records a case of twelve years' duration, that was cured by the repeated exhibition of cathartics. When the skin is in a state of irritation — is fissured, erythematous, or exudes a fluid concreting into scales or crusts — frictions, or even bandages, are not endured by the patient, and are not appropriate. In these, *scarifications* and *blisters* may be employed with the view of giving issue to the fluid infiltrated into the sub-cutaneous tissues. *Cauteries* and *moxas* have also been directed with this intention. Several writers advise douches of *vapour* — simple or medicated; and fumigating baths — either local or general. From my experience of *iodine*, I am inclined to think favourably of it in this disease. In one of the two cases, in which I employed it, manifest benefit was derived. It should be prescribed chiefly internally, as its external application is apt to increase the local irritation: and the bowels ought to be freely and frequently acted upon by deobstruent and stomachic purgatives. The limb should be kept as much as possible in the horizontal position. *Amputation* of the affected part has been advised, and practised in a few instances with success.

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EMPHYSEMA. Syn.—'Εμφύσημα (from ἐμφυσάω, comp. ἐν, in, into, and φυσαω, I blow), 'Εμπνευμάτωσίς, Gr. *Pneumatosis*, Lat. *Windgeschwulst*, Germ. *Emphysème Boursouflure*, Fr. *Enfisema*, Ital. *Inflation*, *Wind Dropsy*.

Classif. — 3. *Class*, 2. *Order* (*Cullen*). 6. *Class*, 2. *Order* (*Good*). IV. Class, II. Order (*Author*).

1. Defin. — *Soft, elastic tumefaction, occasioned by the presence of air, or of any other gaseous fluid, introduced or developed in cellular parts.*

2. Although the sub-cutaneous cellular tissue is the most frequent *seat* of emphysema, yet other parts of the cellular structure may be also affected, either separately and independently, or in connection with it. Those parts of this tissue, which are the most lax and the least loaded with fat, are most frequently and extensively inflated; and parts pressed upon by unyielding structures, or by the action of muscles, although they may give passage to the air, admit not of its accumulation. — J. P. Frank thinks that lean persons are most liable to emphysema: this may or may not be the case; but there can be no doubt of these persons being more generally and extensively affected than those who are fat. When air is infiltrated into the cellular tissue, it may be diffused or conveyed, by the motion of contractile parts, to places remote from that at which it was introduced.

3. Emphysema may be *divided*, according to its *seat*, into — (*a*) *External*, or of the sub-cutaneous cellular tissue; and, (*b*) *Internal*, or of internal viscera. The former may be more or less general, as regards that situation; the latter is commonly limited in respect of these viscera, but is often the source in which the former originates; the admission of air into the cellular tissue of the respiratory passages, by a solution of continuity in the lining membrane, or by rupture of the air cells, being the cause of the great majority of cases of external emphysema. It may also be considered, in connection with the modes in which it is produced — with reference, *a.* to its spontaneous evolution; and, *b.* to its origin in a solution of continuity in some part of a surface communicating with the external air — to its *intrinsic*, and *extrinsic* forms. The division into *symptomatic* or *traumatic*, and *idiopathic* or *spontaneous*, is faulty; inasmuch as the spontaneous secretion of air from the blood into the cellular tissue, is merely a rare phenomenon contingent on far advanced states of disease; and as the introduction of air from without into this texture is not a symptom, but an accidental occurrence — is not a necessary or even a frequent consequence of a wound or injury, but dependent only upon certain circumstances or changes connected with such injury. — I shall therefore consider, *firstly*, the *Intrinsic*, or spontaneously contingent form

of emphysema; and, *secondly*, the *Extrinsic*, or the accidental traumatic conditions.

4. I. The INTRINSIC, or *Spontaneous Contingent Emphysema*, is evidently dependent upon a more advanced state of the same general condition of the frame which gives rise to collections of air in other parts, and which, in its slightest grades, often occasions similar accumulations in the bowels and uterus; the air in such cases being secreted from the blood, and consisting, most probably, of certain combinations of hydrogen and azote, or of carbonic acid. Dead bodies become emphysematous from the gases disengaged during the process of decomposition; and a part which is gangrenous, is often also emphysematous from this change. But in these, the colour and cohesion of the parts are remarkably altered, and other proofs of decomposition are also present. In all diseases affecting the circulating fluid, as typhoid or adynamic fevers, especially those usually called malignant, and where the blood is contaminated by the absorption or introduction of morbid secretions or fluids, the exhalation of air into the cellular tissue and hollow viscera often takes place immediately after death; and, in some instances, it is observed in parts before life is extinct. MORGAGNI remarked it in an advanced stage of fever following the repulsion of a chronic eruption (*Epist.* xxxvii. sect. 22.); FABRICIUS HILDANUS notices its supervention after small-pox; and WILMER, from the absorption of putrid matters. I saw lately an instance of its appearance under the integuments in the vicinity of carious dorsal vertebræ, in a young lady. It was limited in extent, but elastic and crepitating. It is most frequently met with in warm and unhealthy countries, and in certain epidemics. I have seen it in the malignant fevers of warm climates; it has occasionally been noticed in epidemic yellow fever. Dr. W. HUNTER (*Med. Observ. and Inquiries*, vol. ii.) and J. P. FRANK (*De Cur. Hom. Morbis*, l. vi. p. 38.) observed it very generally in an epidemic affecting horned cattle: the latter physician refers to its frequency in the last stage of an epidemic fever that raged in some parts of Germany in 1772, and of a similar fever that prevailed in Italy in 1789; the emphysema appearing about the neck and face, and sometimes extending to other parts of the body. HUXHAM (*Med. Observ. and Inquiries*, vol. iii. p. 33.) remarks its connection with putrid fever and sore throat, as well as with scurvy; and records a case where it supervened, the patient recovering nevertheless. I saw a case of it in scarlet fever that terminated fatally, and another that recovered; and I agree with HUXHAM in considering its appearance about the neck and upper part of the breast as not rare in this and similar diseases. The only question as to these cases was, whether or not the air was evolved or secreted from the blood, or was introduced from without at some part of the respiratory passages in the manner about to be explained. FRANK and some other writers likewise notice its supervention upon erysipelas, when the latter is prevalent in crowded hospitals. MM. RULLIER and DELAROCHE have seen it occasioned by poisoning.

5. The *intrinsic* or spontaneous appearance of emphysema in such cases may be imputed to the partial decomposition or alteration of the circulating fluids consequent upon failure of vital power. This is evidently the case in some instances, especially when the swollen parts are discoloured, and when it comes on near the period of dissolution. But cases sometimes occur where no evidence of decomposition can be traced, depression only of vital power being present. J. HUNTER, FRANK, BAILLIE, HOME, DAVY, and others, have adduced evidence of the evolution of air from the blood-vessels independently of such change. The experiments of Dr. EDWARDS prove that azote, and the other constituent gases of the atmosphere, are more or less absorbed into the circulation, and afterwards discharged from it, chiefly by the mucous surface of the respiratory organs and digestive canal; and that these actions are regulated by the state of the vital energies of the system. It therefore cannot appear surprising that air should be extricated into the areolæ of parts of the cellular tissue, as well as from mucous surfaces, in certain states of morbid vascular action connected with depressed vital power. Besides, we know that air is secreted into the sound or air-bladder of numerous species of fish. As to the chemical constitution of the air which is spontaneously evolved in cellular parts, we have very imperfect information. It is very probably nearly the same as that found in the digestive canal, and which consists chiefly of azote, carbonic acid, hydrogen, and certain of its combinations. In a case recorded by M. BALLY (*Lond. Med. and Phys. Journ.* for June 1831.), in which general emphysema occurred immediately after death, with signs of dissolution of the blood, the air was evidently of the last description; it having taken fire from the flame of a taper, and burnt with a blue and white flame; and the edges of the aperture through which it escaped having been consumed. Gaseous fluids may be evolved also in the cavities of the peritoneum and pleura: but generally in consequence of the decomposition of fluids, &c. previously affused in these situations; although they may likewise be secreted by these surfaces; or common air may accumulate in the pleural cavities, owing to a communication with the vesicular structure of the lungs. (See PERITONEUM, and PLEURA.)

6. II. EXTRINSIC, or *Accidental Traumatic Emphysema*, sometimes appears in the course of various diseases, and from external injuries — of those maladies in which the respiratory functions become especially affected, more particularly the expiratory actions; and from laceration, rather than from puncture or incision, of parts concerned in these functions. It always proceeds, unless in a remarkably rare form of this species, from the passage of common air into the cellular tissue, through a breach of continuity in some part of the respiratory apparatus. — (*a*) It may take place from rupture of the membrane lining the *nasal fossæ*, or from wounds communicating with the lachrymal sac or duct; the air passing into the cellular tissue, upon forcibly blowing the nose. M. MENIÈRE instances two cases of this description. J. P. FRANK mentions its occurrence from playing on wind instruments, whilst the insides of the cheeks are abraded or lacerated. M. RULLIER states that the prisoners in the *Bicêtre* at Paris produced it by puncturing the inside of the cheek, and forcing the breath into the puncture.

7. (*b*) Emphysema is not infrequently occasioned by injuries of the *larynx* or *trachea*, especially when the parts are lacerated by wounds perforating them, particularly when the external outlet is partially obstructed; and by surgical operations on the neck (A. BURNS). Rupture of the rings of the trachea will also produce it. SCHREGER adduces an instance of it from fracture of the thyroid cartilage. Ulceration in these situations, with sthenic vascular action, can hardly be followed by this contingency, as the lymph effused in the areolæ of the surrounding cellular tissue quickly coagulates, and prevents the introduction of air. But when ulceration occurs in connection with asthenic action, emphysema may supervene; as the lymph thrown out in this state of the system is not coagulable, and consequently cannot prevent the air from being forced into the cellular structure.

8. (*c*) Emphysema often proceeds from *rupture of the air-cells*, and interlobular cellular tissue, the air escaping into the latter, and passing along it to the superficial parts of the body, owing to the entire state of the pleura. When the rupture is confined to the air-cells, the air passes no further than the lobule in which the lacerated cells are situated; but when the connecting tissue is also torn, the air escapes into it, and along its areolæ, by the root of the lungs and mediastinum, until it reaches the cellular tissue of the throat, producing a crepitating and an elastic swelling above the clavicles, which is soon diffused over the face, chest, and trunk. This form of emphysema is occasioned chiefly by violent efforts, and straining, as lifting heavy weights (HICKS, MENIÈRE), and child-labour (HAMILTON, HALLIDAY, BLAGDEN, BLAND, SIMMONS, &c.), and by obstacles to respiration, as in hooping cough, pneumonia, bronchitis (DESBOIS, IRELAND, &c.), hysteria, &c., and in cases where a foreign body has fallen into the trachea (LOUIS, &c.). I have seen it occur in the advanced stage of measles complicated with severe pulmonary affection. I lately attended a case of this description with Mr. AUSTIN, in which the only matter of doubt was as to its having arisen spontaneously, or from the interruptions to respiration in the way now explained. But the great difficulty of breathing that was present in consequence of infiltration of air into the interlobular tissue and mediastinum, readily pointed out its origin in this case, as it will in all others of the same kind. Dr. DRUMBRECK has recorded a similar instance, in which he could find no appearance of rupture in the bronchial lining; but it is in the vesicular structure where it should have been looked for; and there it is manifested chiefly by the effects in question. The emphysema that is rarely observed in the course of diseases of the lungs characterised by dyspnœa, and of rabies, hysteria, &c., is evidently of the kind now described.

9. (*d*) *Lacerations* or *perforations* of the *pleuræ*, costalis and pulmonalis, and *lung*, by fracture of the ribs, and penetrating wounds, are the most frequent causes of emphysema. When the fractured end of a bone lacerates both pleuræ, and the superficial portion of lung, the inspired air sometimes passes from the vesicular structure of the latter, accumulates in the pleural cavity, and is forced, by efforts at expiration, through the breach in the costal pleura, into the cellular tissue. Frequently, in consequence of the effusion of blood or lymph, the wound in the lung is in a short time so far closed as to prevent the further escape of air into this cavity; that which was effused being absorbed, and respiration becoming less laborious. In this case, the emphysema soon subsides, owing to the absorption of the infiltrated air. But it occasionally happens that the wound in the lung continues open; and, upon each dilatation of the chest, air is drawn into the pleural cavity, and forced by each expiration into the cellular tissue of the thoracic parietes, until the inflation becomes enormous. When this occurs, respiration is remarkably laborious; inspiration is very rapid; expiration is slower, and more forced, and is quickly succeeded by inspiration; the whole process being short, and apparently attended by an effort to expand the lungs, which are compressed by the air accumulated in the pleura. Emphysema is less frequently occasioned by penetrating wounds of the thorax and lungs, than by lacerations from fractured ribs; owing to the more constant effusion of blood or lymph from the wound in the lung after the former than after the latter, as shown by the experiments of HEWSON; and to the escape of the air from the pleural cavity by the external outlet in the thoracic parietes. It sometimes, however, arises from this cause; closure of the wound in the integuments, or some other obstruction in its more external part, occasionally allowing the air accumulated in the chest to be forced into the cellular tissue during expiration. Penetrating wounds of the chest very seldom produce emphysema, unless the lungs be wounded, and then the reason of its occurrence is obvious. But they may occasion it without any injury of the lungs, owing to the air being more readily drawn into the pleural cavity during inspiration, than expelled from it during expiration.

10. (*e*) *Ulceration* of the pleura costalis and pulmonalis, and of the lung, has in rare instances produced emphysema, chiefly as a consequence of circumscribed empyema, that has opened into the bronchi. In this case, a communication is formed by ulceration between the cellular tissue of the thoracic parietes and the vesicular structure of the lung, the surrounding pleuræ being generally adherent. An abscess in the parietes of the chest likewise may point internally, and, having produced adhesion of the pleuræ, burst into the lungs, and be followed by emphysema. But this last result will not occur in either of the above cases, unless the surrounding tissue is permeable by air, owing to coagulable lymph not having been formed in it. If this tissue be impermeable, then the air will only replace the matter that is evacuated, and give rise to circumscribed emphysematous swelling or swellings, as in a case recorded by Dr. DUNCAN (*Trans. of Med. and Chirurg. Soc. of Edin.* vol. i. p. 455.) A still more rare form is that following empyema which has opened externally through the thoracic parietes. Ulceration may also take place in the lungs, and through the investing membrane, either from a vomica or tubercles, and the air be drawn into the cavity of the pleura; and, having accumulated there, forming pneuma-thorax, be forced through an ulcerated opening in some part of the costal pleura, into the cellular tissue of the thoracic parietes, and be thence diffused to a greater

or less extent over the body. Cases of this kind have been described by KELLY and HALLIDAY.

11. (*f*) The rarest form of *extrinsic* emphysema is that consequent upon the escape of air, through a rupture or ulcer of the internal coats of some portion of the alimentary canal, into the sub-serous cellular tissue, and the diffusion of it through this tissue. HALLER (*Opusc. Pathol.* vol. iii. obs. 31. p. 309.) met with a case of this kind in a female; and M. MARJOLIN (*Archives Génér. de Méd.* t. xi. p. 112.) records an instance of it after a contusion of the abdomen which had ruptured the small intestines. MM. CHABERT and HUZARD (*Observ. sur les Animaux Domest. &c.* 8vo. Paris, 1792.) state that this form is not rare in ruminating animals.

12. III. DIAGNOSIS.—Emphysema of the sub-cutaneous cellular tissue is readily recognised by the uniform, light, elastic, and crepitating swelling constituting it. But it is often by no means so easy to determine the manner in which it has arisen. What has been adduced above on this subject will generally enable the inexperienced practitioner to recognise the different forms of its origin.

13. IV. PROGNOSIS.—Our opinion of the termination of emphysema will necessarily depend upon the causes that have produced it, and the state of the respiratory functions. The inflation is, in itself, but of little consequence, as air may be introduced to a great extent into the sub-cutaneous tissue without giving rise to any serious results,—unless, indeed, in a cachectic and asthenic state of frame, when puncture or laceration of this tissue, or of the integuments is very liable to be followed by gangrene of the part, as in the case recorded by M. MENIÈRE. ARISTOTLE and PLINY allude to a practice of inflating the sub-cutaneous tissue of animals, with the intention of rendering them speedily fat. SCHULZE states, that this process makes them first dull; and that the emphysema generally disappears in two or three days, after which they recover their spirits, acquire a voracious appetite, and, in a few weeks, become very fat. HALLER, GALLANDAT, and SOEMMERRING, adduce similar facts in proof of the introduction of air into the cellular tissue being in itself perfectly innocuous; and ACHARD contends that the insufflation of carbonic acid gas into this tissue is the best mode of administering this fluid in the treatment of disease. FABRICIUS HILDANUS (*Cent.* iii. observ. 18. p. 369.), DIONIS, AMBROSE PARÉ, and KERAUDREN (*Bullet. des Scienc. Méd.* t. iii. p. 422.), mention instances of the insufflation of air into the sub-cutaneous cellular tissue of children, with the intention of exciting compassion, or of showing them as curiosities. SAUVAGES states, that a soldier was similarly inflated during sleep, to an enormous extent, without any further inconvenience than the impediment it occasioned to the respiratory actions. I therefore infer, with M. BRESCHET (*Dict. des Scienc. Méd.* t. xii. p. 20.), that the prognosis in emphysema is altogether dependent upon the disease or injury on which it is contingent, and not upon itself, or even upon its extent; the degree to which the respiratory functions are disordered being the chief indications of danger, as evincing the effusion of air either into the sac of the pleura, or into the interlobular cellular tissue of the lungs. Spontaneous intrinsic emphysema may be viewed as generally a fatal occurrence.

14. V. TREATMENT. — i. Of *Intrinsic Emphysema.*—This species can be remedied only by restoring the depressed vital power, and removing the morbid condition of the local and general circulation on which it depends (§ 4, 5). The means most appropriate to these ends have been described in the articles BLOOD (§ 157.), and DEBILITY (§ 38.), to which the reader is referred. Scarifications and punctures have been recommended when the inflation is considerable; but there is great danger, in this state of disease, of gangrene following puncture of the skin, especially if it be resorted to in hospitals, or in confined or ill-ventilated habitations. More benefit will follow gently stimulating and astringent liniments and epithems applied to the emphysematous surface and vicinity, and active stimulants, tonics, and antiseptics employed internally.

15. ii. *Contingent Extrinsic Emphysema* must be treated with strict reference to the nature of the injury that has occasioned it, and the state of the respiration.—When it has arisen from penetrating wounds of any part of the respiratory apparatus, enlargement of the external wound will generally be requisite, in order that the air may have a direct external outlet. If it proceed from fracture of a rib, the application of a bandage may be serviceable, if the breathing be not materially oppressed; but when respiration is difficult, and pneuma-thorax is present, a bandage is generally injurious, by preventing that degree of dilatation of the lungs which is absolutely requisite to the continuance of life. If the pneuma-thorax from this species of injury, in addition to the external emphysema, be so great as to threaten suffocation, it will be necessary to make an opening directly into the pleural cavity as much as possible in the situation of the lacerated pleura costalis. If the inflation be so extensive as to prove, of itself, an impediment to the respiratory actions, and if the vital powers be not greatly depressed, and the frame not cachectic, several punctures, at a considerable distance from each other, may be resorted to. When the emphysema is more obviously dependent upon rupture of the air-cells, and the escape of air into the interlobular tissue, &c., *anodynes* should be administered in order to lower the force of the respiratory action; and *bloodletting* practised, to lessen the quantity of blood to be acted on by the inspired air. In most instances of traumatic emphysema, the abstraction of blood is requisite, unless the patient is sufficiently reduced by hæmorrhage consequent on the accident. If inflation take place to a very great extent, punctures sufficiently deep to reach the cellular tissue may also be practised in this class of cases, but only in the circumstances and with the precautions now stated. M. DESBOIS advises, in preference to scarifications or punctures, the surface to be enveloped in cloths moistened with camphorated spirit, or a slightly astringent lotion. Unless the inflation by its extent greatly embarrass respiration, little need be attempted beyond the means now mentioned. In cases, however, characterised by great difficulty of breathing consequent upon penetrating wounds of the chest, or fractures of the ribs, or on ulceration, and which are generally preceded by pneuma-thorax, paracentesis of the chest some-

times cannot be dispensed with. But it is necessary, previously to performing this operation, to observe and determine early and accurately, by auscultation and percussion before the inflation becomes extensive, in which pleural cavity the air has accumulated; because an opening made on the sound side, by causing collapse of the lung, would have a fatal result, as in a case recorded by Dr. Halliday. The seat of the injury, and the part at which the emphysema first appeared will generally indicate the situation where it should be performed. (For *Emphysema of the Lungs*, see Lungs —*Emphysema of*.)

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EMPYEMA. See Pleuræ — *Diseases of*.

ENDEMIC INFLUENCE AND DISEASES.

Classif. — General Pathology. — *Ætiology*.

1. This subject is considered in many of its more general relations, in the articles Climate, and Disease; but there remain a few observations, which do not fall under these heads, to be made at this place. The word *endemic* has usually been applied to that *influence* exerted by the geology, soil, water, and air of a particular district or country, and by occupations and modes of living, upon the constitution and health of its inhabitants; and the more common and uniform results, or the consequent forms of morbid action, have been denominated *endemic diseases*. Although Hippocrates directed attention to endemic influences in his *Treatise on Airs, Waters, and Localities*, but little notice was taken of the subject by medical writers until about the end of the seventeenth and commencement of the eighteenth century, when several works on the maladies prevalent in particular districts, and a few on endemic diseases generally, made their appearance. Before this period, however, Caius had offered some observations connected with endemic influence in his work on the *Sweating Sickness*. A few remarks of the same kind are to be found in Andrew Borde's *Dietary of Health*; and in Ramesey's *Origination of Worms*, &c. The earliest work that treated of the general endemic diseases of England was published in London in 1672, by Claromontius, a native of Lorraine, and dedicated to James Duke of Ormond, to whom he was probably domestic physician. In an address to the London College of Physicians, he apologises to that learned body for having encroached, he being a foreigner, upon a province which peculiarly belonged to them. The apology, as remarked by Dr. Duncan, was a tacit rebuke, and the severest he could have given, to a body which, even to the present day, has hardly interested itself in the advancement of medical science. In his enquiry, he enters upon the consideration of the extent to which venæsection is required by the nature of the endemic diseases of this country; and concludes that, although well-timed bloodletting is a judicious practice, yet purging is, upon the whole, oftener required, and better adapted to their cure. After the treatise of this enlightened writer, others appeared, which comprised subjects connected with endemic influences and diseases, either incidentally or specially. But sufficient reference will be made to them at the end of this article.

2. A reference to the topics treated of in the articles Climate, and the *Causation of* Disease, will show that endemic influences are recognised rather by their effects than by positive characters, or manifest and demonstrative properties; and that they are results of several coincidences of physical phenomena and moral conditions, which often vary, and consequently give rise to modified effects. When we reflect that they are consequences of the geology, soil, elevation, temperature, prevailing winds, vegetation, and the vicinity of wood and water; and not of these merely in their various states and associations, but of these in connection with the avocations, the modes of life, and the quality of the food of the inhabitants, modified by moral agencies; we cannot be surprised at the diversity and importance of the resulting effects, and at the general uniformity they frequently present, in certain circumstances or combinations of these causes. In estimating endemic influences in relation to the resulting maladies, there are other agents, besides those now enumerated, that should be taken into consideration. The indolence or activity of the inhabitants; their privations and comforts; their states of filth or cleanliness; their habits of life, and employments; their ignorance and mental improvement; and their social, moral, religious, and political conditions; are most material elements in the general amount of endemic causation. It should not, however, be overlooked, that these diversified agencies act and react in developing, counteracting, or entirely removing each other; that the circumstances of locality will modify the moral and social conditions of its inhabitants; these latter, in their turn, giving rise to numerous collateral changes, and to important alterations even in the conditions of surrounding nature, as demonstrated by the march of civilisation and social improvement in both the old and new worlds. A casual view of the influence of elevated and mountainous situations upon the physical and moral condition of its inhabitants, in relation to those of the plains, or of low, confined, and miasmatous localities, especially within the tropics, and in some of the more southern countries of Europe, will sufficiently

prove the importance of this subject; and if we take a closer view, so that the individual effects upon the frame and on the mind become apparent, the propriety of studying it in its practical bearings must be evident.

3. It was stated in the article Climate, that the constitutions of the natives of a particular country should be considered in many respects as products of the soil and climate, more especially when its physical circumstances are different from those which most generally obtain on the face of this globe, and are productive of disease in the more civilised races of our species. In such a country the human frame has become adapted to the climate to so great a degree as to render it a distinct variety from the rest of the species. We observe this in most low and swampy districts within the tropics, and eminently in Africa, many places of which could not be long habitable to others of the species constituted in any respect differently from the negro. The native frame, being thus assimilated to the climate, and modified by, and suited to, its endemic influences, is not injuriously impressed by them. But when persons whose constitutions are formed by influences of a different, or even of a modified, character, migrate to a country differently circumstanced, disease will sooner or later ensue. This susceptibility to endemic influences different from those to which the constitution has been accustomed, and by which it has been most remarkably modified, is evident in all the races of man, and is evinced more or less in all changes of climate; — by the inhabitant of elevated situations, when he visits the low grounds and plains, even under the same latitude; by the native of northern Europe, when he visits the shores of the Mediterranean — still more manifestly when he migrates to hot climates—and much more remarkably when he resides in low and marshy intertropical districts; by the negro, the Malay, and the Hindoo, when they pass from the warm, moist, and low plains, on which they have been reared, to more elevated situations, or to temperate or cold countries; and so on, as respects all classes of our species, when the change involves a change also of the physical conditions of surrounding nature. This susceptibility is most remarkable in youth and early manhood, and diminishes gradually until age advances, and then the powers of life more readily sink when the change is made to a more unhealthy locality.

4. As endemic influences are frequently the result of certain conditions of locality independent of difference of latitude, or even of temperature; and often depend upon one or two circumstances connected with wood and water, or with the nature of the soil, or with elevation merely above the level of the sea; a change of situation apparently slight, may be essentially great, owing to these or other circumstances, and be followed by the injurious impression of the resulting influences upon persons not accustomed to them. The waters of large towns, that are, to a certain extent, impregnated by decomposed animal matters, seldom materially disorder the bowels of those accustomed to them, unless their impurity be very great, although they may otherwise affect the health; but they will seriously derange the bowels of persons, even in the vicinity, who have not been in the habit of using them, as shown by the different effects of the water of the Seine, at Paris, upon the inhabitants, and upon strangers in that city. Impurity of the water is, in all climates, an important source of endemic diseases, particularly of those seated in the digestive canal and circulation, as dysentery, diarrhœa, and fever; but the soil and vegetation, in connection with the extent to which they are watered, with high ranges of temperature, and with situation particularly in respect of elevation, adjoining acclivities, woods, &c., are the chief sources of these and all others of this class of maladies. The inhabitant of the high lands in the interior of Mexico is seldom affected by fever; but if he remain any time in the low grounds on the coast, in the same latitude, as at Vera Cruz, he is as liable to be seized by the malignant remittent endemic in that place, as the person who has migrated from Europe.

5. i. *Of the chief Sources of Endemic Influence.* — Low marshy places, and grounds subject to inundations, or saturated with moisture, and abounding with the exuviæ of organic substances; thick woods and jungles, particularly in warm climates; argillaceous soils, and the deep alluvial earth in the bottom of valleys, on the banks of rivers, or near the level and shores of the sea or of large lakes, or the embouchures of rivers, especially if subjected to a high temperature; are most productive of endemic diseases, which vary in character with the range of temperature, in connection with the degree of humidity, the extent to which the soil is exposed to the direct rays of the sun, and the prevailing states of the atmosphere. It may be inferred from the writings of the ancients, particularly those of Hippocrates, Livy, Tacitus, Plutarch, and Dionysius of Halicarnassus, that the insalubrity of these places was well known to them, and that the means of removing and counteracting it were as well understood then as at the present day. Hippocrates, in his *Epidemics*, states that the city of Abydos had been several times depopulated by fever; but the adjoining marshes having been drained by his advice, it became healthy. The lake Averna, mentioned by Virgil, is, probably, a poetical exaggeration of the effects arising from marshes; and the deeds of Hercules, the metaphorical record of his success in removing these sources of disease.

6. Pools and ditches containing stagnant water, or nearly or altogether dry, after warm weather; and grounds used for the cultivation of rice; are also important sources of endemic influence. The former, in the vicinity of villages, frequently receive animal exuviæ, which render the exhalations from them much more noxious; and the latter are especially injurious to white cultivators. The extent of disease proceeding from this source has been shown by Lancisi, Bailly, Montfalcon, Irvine, Targioni, Grottanelli, and others, to be, in many places of Italy, Sicily, and Greece, so great, as to occasion more than two thirds of the average mortality. The exposure of a rich, wet, and low soil, abounding with vegetable matters undergoing decay, after repeated irrigations and inundations, to a powerful sun, is the circumstance to which the insalubrity of rice-grounds, and many other places, chiefly is owing. In all intertropical regions, where the nature of the locality admits only of a rice culti-

vation, Europeans are more or less subject to endemic disease; and although the dark races are much less liable to it, owing to the adaptation of their organisation and functions to this particular soil and climate, yet they are occasionally affected by it in a slighter degree, and in a modified manner. Inundations, whether from the sea, or from the swelling of rivers, or from an admixture of sea with river water, render low grounds particularly insalubrious upon their being exposed to the action of the sun's rays. Sea water, owing to the quantity of animal matter it contains, soon becomes offensive when it stagnates on a soil abounding with vegetable substances; and the inundated grounds and islets in the course, or at the mouths, of rivers, are generally left covered, when the waters subside, by mud and slime, which become an additional source of miasmata. The inundations by the sea, which have occurred in many places in Holland, have been the cause of much disease, upon the exposure of the soil to the sun during the following summer and autumn.

7. When low and moist grounds, and deep or rich soils, which have been covered by large trees or by water, are cleared, or exposed to the action of a warm sun, especially in a hot country, they emit more noxious emanations than in their unreclaimed states; and they generally continue so to do, particularly during moist and warm weather, and after long continued droughts following heavy rains, until they are completely brought under cultivation, and even for ages afterwards, in warm countries, near the level of the ocean, or the sea-shore; — circumstances which combine to make so many places in the West and East Indies productive of disease. Rich soils covered by large trees, and other bulky vegetable productions, are thereby protected from the action of the sun; and the exhalations which are given off from them, during warm and moist states of the air, are confined by these productions to the situations which produce them. Dr. Rush states, that the endemic disorders of Pennsylvania were converted, by clearing the soil, from intermittents and mild remittents, to bilious and malignant remittents, and destructive epidemics; and that it was not until the soil had been subjected to cultivation for a number of years, that a tolerable degree of healthiness was procured. The district of Bresse, in the Lyonnais, when well wooded, was comparatively healthy; but now, deprived of its woods, the low and wet soils being exposed more to the action of the sun, the exhalations from these, and from its numerous marshes and stagnant pools, are no longer confined by surrounding forest trees; and, consequently, endemic diseases of a severe character are very prevalent. Similar instances are to be found in the works of Devèze, Monfalcon, and Bailly.

8. There are various circumstances connected with the production and diffusion of exhalations given out from the soil, that require attention from the medical practitioner. Some of them are noticed at another place (see Disease, § 55, 56.); but it seems fully established, that dead animal matter and exuviæ in situations producing these exhalations, contribute most remarkably to their noxious effects. In warm countries, or in hot seasons in temperate climates, the places which are most productive of malaria, generally, also, abound the most in animal substances undergoing decomposition. The circumstances which render vegetation quick and luxuriant, generate immense swarms of insects and reptiles, the exuviæ and dead bodies of which mingle with vegetable matter in a state of decay, and give rise to miasms, particularly during moist states of the air, much more noxious than those resulting from vegetable matter alone. I have always considered the number of insects and reptiles, with which a place abounds, as more indicative of its insalubrity, than almost any other circumstance. Malaria may be conveyed a considerable distance from its source, and be condensed in the exhaled vapour, when attracted by hills or acclivities in the vicinity, and when there are no high trees or woods to confine it, or to intercept it in its passage. Owing to this circumstance, high grounds, near exposed marshes, are often more unhealthy than the places immediately adjoining, that are on a level with them.

9. There are no circumstances that tend more to increase the sources of endemic influence, than high ranges of temperature, and calm states of the air. The effects of these vary remarkably with the quantity of humidity exhaled, and with the conditions of the air, in respect of horizontal and vertical currents, and of electricity. However productive the sources of malaria may be, and however rapid the evaporation from them, the effects will be comparatively slight, if there be a quick renewal of the atmosphere passing over their surfaces, preventing the stagnation and concentration of the effluvia emitted by them. A high temperature, particularly with exposure of the soil to the sun's rays, penetrates to the lower alluvial strata; and, if it be attended by protracted dryness, occasions wide fissures in the upper strata, through which the moisture of the lower passes in the form of vapour, which is often more noxious than the emanations from a wet or marshy situation, especially when the soil is argillaceous or absorbent. It is also indirectly owing to temperature, and the greater capacity it gives the air for moisture, that the marshes of warm, or even of temperate, climates are infinitely more unhealthy than the bogs and peat mosses of northern countries. High temperature and humidity, together with richness of soil, generate succulent plants which contain saccharine and oleaginous principles, and carbonaceous and hydrogenous elements, with a portion of azote; and which rapidly pass, either altogether or partially, through the alternate processes of growth and decay. The vegetable productions, also, of hot countries, especially those which are most abundant, possess much less of the antiseptic principles, with which those of cold climates abound, particularly tannin, creosote, the terebinthinates and their associated resins, the gallates, &c., which are found largely in the plants contributing to the bogs and peat mosses of the latter. Besides, the marshy places, and the surfaces of alluvial soils, in warm countries, contain more animal matters undergoing decomposition, than in cold and temperate regions; and are subject, in alternate succession, to periodical rains and long droughts — are alternately inundated, and exposed to the direct action of the sun. Stillness of the atmosphere, by favouring the accumulation of malaria

in the lower strata, and in circumscribed limits, increases the injurious influence of this agent upon the human economy. Hence the danger of exposure to its sources during still and humid states of the air, at the close of the day, when it is condensed in the descending moisture; or at night, or approaching dawn, when it is unrarefied by the solar heat, and not yet carried to the higher regions by the ascending or vertical currents of the atmosphere, and when the system is most exposed to its impression. During moist states of a warm atmosphere, also, the equilibrium of its electrical conditions is disturbed; the relative electrical states of this fluid, and of the body, is also considerably modified; and the changes produced upon the blood in the lungs, by respiration, are somewhat retarded. These effects are materially influenced by the situations and circumstances now adduced, and the respiratory functions remarkably impeded by them.

10. The good effects of a quick renewal of the air, in unhealthy places — of high winds, hurricanes, and thunderstorms — in dispersing and altogether sweeping off the exhalations from the soil, and from decayed animal and vegetable matters, must be apparent. The more violent commotions of the air are the means employed by Providence to dilute, or entirely dissipate, those noxious agents, and to prevent their pestilential accumulation in the situations which have been described. It has been observed, especially in warm climates, and in hot seasons in temperate countries, that, when the air has been long undisturbed by high winds or thunderstorms, and at the same time hot and moist, endemic diseases have assumed a very severe, and even epidemic, character. Numerous facts illustrative of this have been adduced by Rush, Webster, Chisholm, Clark, Devèze, Bancroft, and others. It is generally in hot miasmatous countries, and after prolonged seasons of drought and still states of the air, that tornadoes occur in hot climates, and thunderstorms in temperate countries, purifying and refreshing all the objects exposed to them, and preventing the occurrence of these severer forms of disease which would otherwise supervene.

11. Although the localities and related conditions described above are sources of diseases, chiefly in warm climates, and in temperate regions during hot seasons, they are not entirely destitute of influence in cold countries; their ill effects being generally in proportion to the height and duration of the summer temperature, and to coincident circumstances. In northern temperate latitudes, and inland situations, the dryness of the air, especially during low ranges of the thermometer, and when the surface of the earth is sealed by an icy congelation, not only does the human frame enjoy a perfect immunity from terrestrial emanations, but it experiences an accumulation of positive electricity, and increased activity of all the functions. The changes produced by respiration are most complete; the nervous and circulating systems evince increased tone; animal heat is rapidly generated to replace that carried off by the surfaces, the body acquires the phlogistic diathesis, and diseases present the sthenic forms.

12. ii. *Effects of Endemic Influence.* — *A.* The exhalations from the situations now described, at the commencement, during, and after heavy rains and moist states of the air, generally occasion agues, dysentery, scurvy, scorbutic dysentery, enlargements of the liver and spleen, cretinism, scrofula, rickets, &c.; and if the temperature be high, the various forms of remittent and continued fevers, in addition to these. The same localities during warm and dry seasons, and after protracted drought, produce bilious and malignant fevers, of a remittent and continued type, cholera, diseases of the liver, and inflammations of the alimentary canal; the intermittent and remittent fevers prevalent during the colder seasons, passing into a more continued type, and bilious or malignant form, after great or continued heat. This change in the character of the endemic with the temperature and seasons, was well illustrated by the history furnished by M. Kirchoff (*Journ. Complément. des Scien. Méd.* Jan. 1827.), of the diseases following the partial inundations by the sea of some parts of Holland, in the winters of 1825 and 1826. He states that the waters used for domestic purposes were brackish; and the ponds and ditches, which were usually limpid during the spring, became greenish on the surface, and offensive. At this time, agues prevailed amongst workmen exposed to the exhalations from these sources. As the summer advanced, and the waters were more completely drained off, the effluvia were more concentrated, and fevers assumed a remittent type. In the months of August and September, fever presented more of the continued character, with periodical exacerbations, particularly of the pains in the head and back, and closely resembled the endemic of low and moist situations within the tropics, — the circumstances occasioning it having been in every respect similar. In the majority of cases, the liver was affected. It has been shown by writers on the fevers endemic in Hungary, that agues are most prevalent during spring; and that remittents, continued fevers, and dysentery, become more common during summer and autumn. Indeed, endemic fevers are modified, from the more simple form of ague to the most malignant remittent or continued type, by the particular circumstances in which they originate, — as the miasms become more concentrated, or consist more of the effluvia of decayed animal substances, — by the warmth of the season and climate, — by the humidity and dryness of the air, — and by the constitution and predisposition of the patient. As these vary, so does the particular character of the disease. Intermittents present every type, and various complications; and remittents, numerous grades and forms — the bilious or gastric, the inflammatory, the bilious inflammatory, and the asthenic or malignant. Continued fevers, also, assume a mild, an inflammatory, a gastric, or an adynamic form. Not infrequently, the intermittent passes into the remittent, and this latter into the continued type; and either may be followed by dysentery. Each of these states of fever may be simple or complicated; the principal local affection being different, as well as diversified in kind, in different cases, and appearing sometimes so early as to seem the primary disease, frequently in the advanced progress of the fever, and occasionally not until its latter periods. Either of these forms of fever may commence mildly and insidiously, and yet soon pass into dangerous local derangement and disorganis-

ation; others may begin with great excitement, rapidly terminating in exhaustion and depravation of the circulating and secreted fluids; some present great depression from the beginning, the powers of life never rallying throughout, or very imperfectly, with an unnatural state of all the secretions and soft solids, and a tendency to dissolution of their cohesion, which rapidly advances, especially in warm countries, as soon as respiration ceases. In certain circumstances, particularly when great vicissitudes of temperature and weather cooperate with the strictly endemic causes, or with improper living, impure water, &c., dysentery becomes as prevalent as fever, or entirely usurps its place; or the fever assumes a dysenteric character, or passes completely into dysentery; this latter malady producing even a greater rate of mortality than fever itself. (See art. Dysentery.)

13. *B.* Whilst rich soils, and warm, low, moist, and marshy situations, are productive of disease affecting chiefly the circulating and secreted fluids, and the abdominal viscera, by lowering vital power, especially as manifested in the nervous systems; elevated, cool, or temperate and dry districts favour the developement of vital energy, especially as expressed in the nervous, muscular, and circulating systems, and in the thoracic viscera; and produce diseases of a phlogistic character, as sthenic inflammations of the lungs and circulating organs, of the membranes of the brain, and of the other serous and fibrous structures, hæmorrhagies, rheumatism, and fevers of an inflammatory type.—These diseases, however, although the most prevalent, can scarcely be said to be endemic in these latter localities, they being much less frequent than the maladies of the former situations. It should, however, be recollected that the respective endemic influences of districts are not so deleteriously exerted on the native inhabitants, as upon those who have lately removed to them; and that, though they may affect the constitutions of the former class, and give rise to certain diseases in preference to others, yet those diseases are not so acute or violent in them, as in the latter. This circumstance is well illustrated by what is constantly observed in warm countries productive of terrestrial emanations. There, the native inhabitants are either scarcely affected by them, or are liable only to agues, bowel complaints, enlargements of the spleen, or slight ailments referrible to the large secreting organs, excepting on occasions of these exhalations becoming more concentrated or energetic than usual. But persons who have removed thither from healthy localities, in cold or temperate climates, sooner or later are seized by fever, generally of a remittent, or continued type, often assuming an inflammatory or malignant form, and frequently associated with violent local determinations; and it is not until after the frame has been assimilated to the climate by such attacks — usually called the seasoning fever — that agues, dysentery, and the milder forms of disease, appear in such persons. On the other hand, the inhabitants of low or miasmatous situations, who have removed to elevated and mountainous districts, are much more liable to diseases of the lungs, to rheumatism, and to inflammations of a sub-acute or chronic form, than the natives of these latter places; and if the change at the same time involves a change from a high to a low temperature, the liability to pectoral maladies is still further increased.

14. *C.* When persons have migrated to a country abounding with the sources of endemic diseases, a period of longer or shorter duration, according to the activity and concentration of the malaria, and the predisposition of the individual, usually elapses before they are attacked by these maladies. In Rome, and other malaria districts in the south of Europe, as well as in many of those in the eastern and western hemispheres, where the exhalations are not very active, several months, or even a year or two, pass before the unacclimated are seized by fever, unless the exposure and predisposition (see Disease — *Predisposing Causes of*) be great. Whilst in many situations, where the emanations are more concentrated, or consist of an admixture of those given off both by vegetable and by animal matters in a state of decomposition, particularly in warm climates and seasons, the first exposure to them is often productive of the most active forms of fever, and in a very short time after the exposure occurs. This is commonly observed in respect of young unseasoned sailors and soldiers, who, coming from a pure air, in a state of high predisposition, are often subjected to these emanations in their most active states. Persons arriving in warm miasmatous districts, from temperate and healthy places, are affected with a celerity and severity generally in proportion to the fulness of their vascular systems, to the rigidity of their fibres, and to their nearness to the epoch of early manhood; but various exceptions to this occur, arising out of the habits of individuals, the susceptibility of their nervous systems, the extent of their exposures, and the states of their minds and moral emotions.

15. *D.* Although the white races of the species will live to an advanced age in warm districts productive of endemic disease, especially if they have removed thither after the constitution has been fully developed; yet their offspring will very seldom reach maturity, or survive the epoch of childhood, if they continue to reside in such situations; or, if they arrive at manhood, they will very rarely reach an advanced age. Dr. Jackson states, that white persons, born and residing in the more unhealthy districts of Lower Georgia, seldom live to forty; and that, at Petersburgh, in Virginia, they rarely reach twenty-five. He saw, at this latter place, a person who was only twenty-one; and although he had never been confined by severe sickness, yet he was weak and decrepit: so injuriously does endemic influence operate upon the constitutions of the white variety, even when it fails of inducing acute disease. Bruce records similar instances among the white natives of the banks of the Nile, in Abyssinia; and other illustrations have been observed by myself in some parts of Africa. Children born of European parents in India require to be sent to Europe to acquire due maturity and strength; for they very seldom arrive at puberty in India. The case, however, is different when one of the parents belongs to the indigenous inhabitants; but there can be no doubt, that, were a colony of the white races conveyed to the low miasmatous localities within the tropics or in more temperate regions liable to very hot seasons, it would, in a very few generations, become extinct, if intermarriage did

not take place with the natives, or if it were not supplied from time to time from more salubrious places. Whilst a change to a more unhealthy climate is best endured by those who have arrived at full maturity, change to an equally or a more healthy climate is especially beneficial to very young persons, unless in the case of removal of individuals belonging to the dark races to a temperate country, from the hot climate in which they are indigenous.

16. *E.* Besides fevers, dysentery, and the slow blight of the constitutional powers, the localities above described induce, in the white races, diseases of the spleen, liver, and pancreas, both in unassociated forms, and as complications with fevers and dysentery. Among their less obvious effects may be enumerated scurvy, and foul ulcers of the lower extremities. The great prevalence and obstinacy of these latter in miasmatous situations have not been sufficiently attended to, although BAGLIVI had noticed the circumstance in Rome, and CLEGHORN in Minorca. Indeed, in all low places productive of malaria, injuries and sores of the legs heal with great difficulty, whilst those of the head recover rapidly. HIPPOCRATES and CELSUS seem to have been aware of this fact. They both notice the frequent association of indolent ulcers of the legs with enlargement of the spleen,—which is remarkably common among the cultivators of rice-grounds, both in the south of Europe, and in other quarters of the globe.

17. There are some situations, which do not fall within the description given above, productive of diseases almost proper to them; or which are comparatively rare elsewhere; as *cretinism, bronchocele, plica* or *matted hair, Guinea worm, tarantulism, pellagra, &c.* These depend in great measure on the water, in conjunction with modes of living, and various other circumstances. — (*a*) *Cretinism* (see this article) is endemic in the deep ill-ventilated valleys of the Alps and Pyrenees, in Carinthia and the Vallais, in the mountainous parts of Tartary and China, in some parts of the south of France, and in Salzbourg. It seems not to have been unknown in this country, two or three centuries ago, in the situations where bronchocele and rickets — very nearly allied diseases — have continued to be common. — (*b*) *Bronchocele* is very frequent in the situations now particularised, especially in the valleys of the Alps, where it was equally prevalent in the times of PLINY and JUVENAL; in Derbyshire; in Behar, and some other mountainous districts of northern India; in similar situations in Java (S. RAFFLES) and Sumatra; in Bambara, in the course of the Niger (M. PARK); and in Mexico, and some other parts of South America (HUMBOLDT). It is most prevalent in females after puberty; and is, in my opinion, often connected with interrupted or irregular catamenia. —(*c*) *Plica*, or *matted hair*, is not noticed by the ancients, and it is doubtful when it first appeared — probably some time between the thirteenth and fifteenth centuries. It is most common in Poland and Lithuania; but it is met with occasionally in Transylvania, Hungary, the southern parts of Russia and Tartary, and more rarely in Switzerland, Belgium, and Prussia: but it is not so frequent, even in Poland, as it was a century ago. It proceeds chiefly from want of cleanliness, especially in respect of the hair, and to wearing too warm coverings on the head (KERCKHOFFS, LARRY, ALIBERT, &c.). There appears to be frequently an hereditary predisposition to it; but the cause now assigned is evidently the most influential in producing it, assisted by the use of unwholesome water (VICAT). It is most common amongst the poorest classes. According to Dr. L. KERCKHOFFS (*Med. Trans. of Coll. of Phys.* vol. vi. p. 27.), it is not infectious (see art. HAIR). — (*d*) *Tarantulism* (see CHOREA, § 18.) was formerly endemic in Apulia, but is now by no means so frequent (LAURENT and MERAT). This species of irregular convulsive or hysterical affection, in which the moral emotions seem more disordered than the physical powers, was imputed by Sir T. BROWNE, BOYLE, KIRCHER, BAGLIVI, MEAD, and SAUVAGES, entirely to the bite of the tarantula spider, which probably is an exciting cause, in certain states of the nervous system, although neither the only nor the chief cause. CORNELIO, SERAO, and CIRILLO, physicians in Naples, and M. NOLLET, have taken juster views of its origin; and refer it rather to the state of the nervous system in connection with the moral emotions, than to this insect. Indeed, it is extremely probable that it is often feigned, or frequently occurs, without any such accident as that to which it is so commonly imputed; for very nervous and fanciful females may persuade themselves that they are stung by this insect, in order to account for their ailments, conformably with the vulgar opinion, and may thereby induce that form of irregular chorea or hysterical affection to which the term tarantulism or tarantismus has been applied. M. MERAT (*Dict. des Sciences Méd.* t. liv. p. 345.) infers that the inhabitants of Apulia, owing to situation and climate, are liable to nervous and spasmodic affections; and that, among others, this is apt to supervene, — from their ardent and choleric dispositions, and their love of dancing and music. In Calabria and the Apennines, where chorea and convulsive affections are common, tarantulism also occurs (FERRUS). — (*e*) The *Guinea worm* (*Dracunculus*), the long thin worm which is sometimes found in the inhabitants of certain localities, generally under the integuments, and so named from the circumstance of its having been first accurately observed in the natives of Guinea, is now seen in other countries. It appears from PLUTARCH to have been met with in the inhabitants near the Red Sea. It occurs among the negroes in most of the low marshy situations of intertropical Africa (WELSCH, BRUCE, PARK, &c.); in the slaves, and sometimes in the whites, in the West India islands (CHISHOLM, THOMAS, &c.); in Bombay, and along a great part of that coast, as well as in some other maritime districts of India (M'GRIGOR, MILNE, H. SCOTT, GRANT, &c.); and in the islands of the Persian Gulf (KÆMPFER). — It is observed chiefly during the months of November, December, January, and February, in both the East and West Indies. M. DUBOIS found, in parts of the Carnatic and Madura, more than one half of the inhabitants of some villages affected by it. Dr. CHISHOLM (*Edin. Med. and Surg. Journ.* vol. xi. p. 145.), Dr. SMYTTAM (*Trans. of Med. and Phys. Soc. of Calcutta*, vol. i. p. 179.), Dr. ANDERSON, and several others, state that it is met with chiefly in those who use wells made in argillaceous soils, impregnated with salt or percolated

by sea water. M. DUBOIS adds, that the inhabitants of villages who take water from one well are subject to this worm, whilst those at the distance of only half a mile, who resort to a different well, are not affected by it. Other writers, in addition to those named above, agree in ascribing it to brackish waters containing the ova or embryo of this worm. The circumstance of this animal having been rarely found out of the human body has induced Dr. MILNE (*Edin. Med. and Surg. Journ.* No. 106. p. 112.) to suppose that the substance taken for it has been a diseased lymphatic vessel; but the evidence of its independent existence furnished by Dr. H. SCOTT (*Med.-Chir. Rev.* vol. iv. p. 182.) and Dr. R. GRANT (*Edin. Med. and Surg. Journ.* No. 106. p. 114.) has set the matter at rest. As to the manner in which this worm becomes lodged in the sub-cutaneous cellular tissue, much doubt exists. It must either insinuate itself through the skin from without; or its ova escape the action of the alimentary juices, and pass along with the chyle into the circulation, and thence into the cellular tissue, where, having attained a certain growth, it excites the irritation preceding its expulsion. But if it pass by this latter route, how is it that it is never found in the cellular or other parts of internal organs, where it may be expected to produce dangerous, if not fatal, effects?

18. *F.* In low, moist, and cold districts, liable to frequent vicissitudes of weather and temperature, catarrhal and rheumatic affections, croup, bronchitis, scrofula, rickets, and tubercular diseases, are more or less prevalent; and in those similarly situated on the sea coast, where the inhabitants live chiefly on fish — particularly on stale or dried fish, or the grey kinds — chronic eruptions on the skin are common. In large towns and cities, where a confined and impure air cooperate with the anxieties of business, the exhaustion of mental exertion or of dissipation, the luxuries of refinement, the conflict of the passions, and the excitement of the different moral emotions, disorders of the nervous system frequently implicating the manifestations of mind, are more common than in the country, and much more so than in imperfectly civilised states of society.— My limits will admit only of a simple reference to other endemic diseases — to the prevalence of trismus and tetanus in the West Indies; of elephantiasis in these islands, and in the East, as well as in Africa; of the yaws in the negro race; of the pellagra in Lombardy and the Milanese; of the beriberi in the East Indies; of hepatic colic (see COLIC, § 20.) in Spain and the West Indies; and of ophthalmia in Egypt. Some of these may be imputed to obvious physical causes; as the ophthalmia of Egypt to the reflected heat, and the dust in the air; or pellagra and some cutaneous diseases, to dirty habits and unwholesome food: but there are others that cannot be explained without ascribing them to the cooperation of a variety of circumstances, as shown in the articles on these maladies. In illustration of the influence of occupations in producing a certain train of morbid actions in those similarly circumstanced, it may be stated, that amongst the children and young persons employed in cotton mills, more especially in Manchester, chorea, which is comparatively a rare disease, is one of the most common; scrofula, tubercles, and debility in all its states, being likewise very prevalent; and that, in the somewhat older work-people, chronic rheumatism, in all its forms, is remarkably frequent. The protracted periods of occupation in a very hot and moist air, and generally in a standing posture; the sudden exposure to a cold atmosphere on every occasion of leaving the factory; and the want of due sleep, of exercise in the open air, and often of sufficient nourishment, independently of various moral causes; sufficiently explain the endemic prevalence of these diseases in the large manufacturing town now mentioned. (See ARTS AND EMPLOYMENTS — *as Causes of Disease.*)

19. iii. *Of the Mode of Operation of Endemic Influence on the Economy.*—The endemic causes productive of the more acute and malignant diseases were suppposed by CULLEN to be direct sedatives, not merely lowering vital power, but also inducing spasm of the extreme capillaries; and that, if the vital energy of the system is not entirely overpowered by them, reaction supervenes in order to overcome this spasm, and thus fever becomes developed. Other pathologists suppose that marsh effluvium acts as a stimulant or irritant; and that the debility which it obviously occasions, is either consecutive, or a state of exhaustion. Neither of these hypotheses accounts for the whole phenomena which diseases, arising from this cause, evince throughout their course, although either explains many of their symptoms. That malaria depresses vital power, contaminates the circulating and the secreted fluids, and weakens the vital affinity or cohesion of the soft solids, is shown by its more immediate, as well as by its consecutive, effects upon the living body, and by the fact of dead animal matter running faster into putrefacfaction in situations where it abounds. Its septic operation on sores and wounds is often evinced during life. It has been repeatedly proved, that substances fabricated of silk, woollen, and even of cotton and flax, exposed to marsh exhalations, very rapidly undergo decay; silk and woollen becoming putrid, and cotton and linen assuming a dingy or yellow hue, and afterwards losing their cohesion. These effects are generally rapid and complete, in proportion to the moisture and warmth of the air, and the concentration of malaria in it; and so well are they known, M. MONFALCON states, that they are generally recognised by the more intelligent inhabitants of Italy and the south of France, as indications of the insalubrity of particular places and seasons.

20. iv. *Of preventing the Production of Endemic Causes, and of counteracting their Effects.*—*A. Of preventing the generation of malaria.*—(*a*) *Draining* marsh grounds is one of the most efficient modes of preventing the formation of malaria; but it should be recollected, that uncovered drains and ditches are fruitful sources of endemic influence.—(*b*) *Embankments* thrown up against inundations from rivers and the sea, are also important means of prevention; but, if they be not quite adequate to the purpose, they may aggravate the evil, by preventing the water from retiring with sufficient rapidity.—(*c*) In situations admitting of neither of these means being employed, then advantage will often be derived from *covering them entirely with water*; for lakes do not exhale miasmata until after the mud and soil of their bottoms and sides have appeared above the surface. SENAC states, that the outskirts of a

large town became unhealthy as soon as the mud at the bottom of some adjoining morasses was exposed to the sun and air; but that disease disappeared when they were completely inundated. Dr. ROLLO mentions, that mild intermittents prevailed in St. Lucie during the rains, when the pools and marshes were filled; and that dangerous fevers appeared after their slimy surfaces became exposed and completely dry. Mr. ANNESLEY records similar facts in relation to various places in the East Indies. The ditch round the ramparts of Geneva was once drained, and sickness prevailed in the vicinity, but disappeared when it was again filled. And the water-courses and beds of rivers that are dried up in summer, particularly in warm countries, and thereby become sources of malignant fevers, are quite innocuous when filled (FERGUSON, &c.).— (*d*) *Clearing the soil* from its more bulky vegetation will be beneficial only when an assiduous cultivation is adopted, without the necessity of having recourse to a very abundant irrigation. In many circumstances, however, this measure will greatly aggravate the insalubrity of a district, as shown above, especially in respect of low swampy places within the tropics, or near the sea. Facts illustrative of this, have been often observed in both the old and new worlds.—(*e*) Protecting the soil in which large cities are built, particularly when situate near the embouchures of rivers, &c., from the action of the sun, by a closely laid pavement; intersecting the strata of earth by large deep sewers, conveying the exuviæ and other impurities beyond the reach of the inhabitants, and in such a way as to prevent the escape of emanations from them, in the midst of a dense population; and removing places of sepulture beyond the outskirts of cities and towns; are measures of the utmost importance to the health of the community.

21. It is established beyond a doubt, that the narrow winding streets of towns built in low situations, or in the vicinity of marshes, are, especially when the houses are high, actually conducive to health; inasmuch as the exhalations transported from thence, have a less ready access to all parts of them, the horizontal currents of air being more completely intercepted by the nearest buildings: also, when the streets are narrow, and the houses high, the sun cannot act upon the soil, which necessarily becomes saturated with animal exuviæ, unless deeply intersected and purified by drains and sewers. The importance of this consideration was not overlooked by the ancients, as appears from the remark of TACITUS, on the rebuilding of Rome after its destruction by Nero. "Erant tamen, qui crederent, veterem illam formam salubritati magis conduxisse, quoniam angustiæ itinerum, et altitudo tectorum non perindè solis vapore perrumperentur. At nunc patulam latitudinem, et nullâ umbrâ defensam, graviore æstu ardescere." (*Ann.* l. xv. 43.)

22. *B.* Whilst the above measures have reference chiefly to the prevention of the formation of terrestrial exhalations, there are others that may be employed to *confine them to the sources whence they issue*, when the former means are ineffectual, or cannot be put in practice. It is very probable that many places, the insalubrity of which was recognised and guarded against by the ancients, have actually become more unhealthy in modern times, owing to the accession of alluvial soil washed down from the higher grounds in the vicinity; to the accumulation of decayed organised matter and mineral detritus at the mouths of rivers, and in the bottoms of lakes, which have been thereby converted into marshes; to the neglect of the drainage and cultivation which a former crowded population was enabled to preserve; and to the removal of those screens of trees which confined the exhalations to the place that generated them. The importance of these considerations has been insisted on by LANCISI and BROCCHI, in respect of Italy; by MONFALCON, with reference to France; by ANNESLEY and myself, in regard to warm climates; and by M'CULLOCH, as respects this country. It was remarked by PLINY, and some others, among the ancients, that trees absorb the exhalations which prove injurious to man; and the observation is perhaps just: but whether trees simply obstruct the transit of malaria from its source, and confine it there, or actually absorb it along with the moisture in the air, and dew which rests on their leaves; or whether they act in both ways, in addition to their shading the soil from the action of the sun; the power they possess, in low and marshy situations, of moderating the generation of malaria, and confining it to its source, is indisputable. It is, therefore, important to plant trees around, and more especially to leeward of, unhealthy places (§ 5.), in order to screen persons living in their immediate vicinity from their influence. Owing to the extent to which trees, high houses and walls, and intervening water not liable to become stagnant, protect places near the sources of malaria from its effects, is to be explained the fact of the inhabitants of one side of a street, or road, often escaping ague, whilst many of those living on the other side are affected; and of the crew of one ship being seized with fever, while those of another, somewhat further removed from the shore, escape.

23. *C.* There are other means, besides those enumerated, *which both destroy and counteract, or otherwise remove, the causes of endemic maladies.* —(*a*) In the case of impure water, filtering it, especially through charcoal; boiling it before it is used, or passing it through lime; preserving it in iron tanks on board ships; and adding to it a small quantity of either of the chlorurets, when it cannot be otherwise deprived of a portion of animal matter; are very important precautions. When sewers, drains, ditches, and other confined sources of impure air cannot be removed, or covered so as to prevent the emission of effluvia, the chloruret of lime should be thrown into them from time to time. A solution of the same substance, or either of the other chlorurets, ought also to be liberally employed in the wards of crowded hospitals, whenever the air becomes close and foul, in order to prevent the prevalence of fever, dysentery, erysipelas, and gangrene; and should also be poured down the privies. Similar precautions ought also to be employed in crowded transports and ships of war, as well as in camps and besieged towns, more especially if disease appears. But this means is only subsidiary to free ventilation; and is most to be confided in when the latter cannot be established. By having recourse to these disinfectants, the sickness that sometimes arises from the leakage of sugar, or the decomposition of vegetable matter collected

in the hold or between the timbers of ships, and from the action of bilge water on chips or shavings, as recorded by Sir W. Burnett and other able observers, and the ill effects contingent on the steeping of flax and hemp, may be entirely prevented.

24. (*b*) Whatever progress is made in civilisation, in the cultivation of the soil, and in the useful arts of life, tends to diminish the prevalence of endemic diseases. Improved modes of culture introduce a greater abundance of wholesome nourishment, and, together with a more extensive commerce, render subsistence much less precarious than in the ruder states of society. It is chiefly owing to these circumstances that scurvy, dysentery, and diseases of the skin, are much less common now than formerly. These, also, aided by personal and domestic cleanliness, much better clothing, and a freer ventilation of houses, hospitals, prisons, &c., have tended greatly to diminish the general amount of mortality. As respects prisons, the diminution of disease, chiefly resulting from stricter attention to cleanliness, ventilation, and diet, shown to have taken place in those of France, by M. Villerine, is most striking. At Lyons, from 1800 to 1806, the annual mortality in the prisons was 1 in 19; from 1806 to 1812, it was 1 in 31; from 1812 to 1819, it was 1 in 34; and from 1820 to 1826, 1 in 43. A similar amelioration has also been remarked in the prisons of Rouen, and some other large towns in that kingdom. Although other diseases may appear, there can be no doubt that those that are more strictly endemic diminish before the progress of civilisation and the increase of the comforts of life.

25. (*c*) The healthiness of the inhabitants depends much upon the choice of residence. This obtains, especially in warm climates, in respect of both casual and permanent residents. Where the winds blow from particular quarters, at certain seasons and hours of the day, buildings or encampments should be placed so as to be, during the night especially, to windward of the principal sources of endemic disease. Ships, also, should be anchored, as much as possible, with a regard to this precaution, or at a distance from an unhealthy coast sufficiently great to admit of the dilution of the malaria, or of its absorption by the water, before the winds conveying it reach them. When a temporary residence must be to leeward of a swamp, then some advantage may accrue from lighting fires between it and this source of disease, particularly during night, and from double tents, within which gauze or fine net curtains are kept spread. Buildings either near, or to leeward of any source of malaria, or standing on a deep, moist, or argillaceous soil, should be very high; the ground floor should be left unoccupied, and be open on every side to permit complete perflation; and that side ought to be always shut, on which the prevailing night or land winds blow, or towards the place from which unhealthy exhalations proceed. The inhabitants should also sleep near the tops of the houses, where, if built high, they will generally be placed above the more concentrated vapour and miasms, and, in great measure, beyond their influence; for, although gentle acclivities or hills in the vicinity will often attract malaria, or be swept by currents of air conveying it, yet precipitous elevations and high houses, even near its sources, will frequently escape, as, from its specific gravity, it is confined chiefly near the surface of the earth.

26. (*d*) The diet of persons exposed to noxious exhalations should be easy of digestion, and nourishing, but not heating. Animal food should be taken sparingly, and spirituous liquors and strong wines laid aside. The lighter and thinner wines may be used in moderation. In hot climates or seasons, exercise in the heat of the day, or while exposed to the sun's rays, ought to be avoided; but it should be regularly taken without causing fatigue. Such medicines as will promote the secretions and excretions, particularly those of the liver and bowels, may be resorted to when these functions require aid. For this purpose, two or three grains of blue pill, with the aloes and myrrh pill, may be taken at night, and equal parts of the compound infusions of gentian and senna in the morning. When exposure to malaria, either at night, or early in the morning, is to be dreaded, a moderate dose of bark or sulphate of quinine, with camphor or some warm spice, as Cayenne pepper, may be taken previously to such exposure. A fire should be lighted in the apartment, or near it; and care be taken to exclude the raw night air, especially in the direction of the sources of miasmata. On occasions of this kind, smoking cigars will be serviceable. The tenour of the mind should also be duly regulated. The depressing passions and ideas, and all undue excitement, as being liable to be followed by depression, ought to be avoided. A calm, confident, and well-employed mind—moderately occupied, and interested with its pursuit,—unruffled by gusts of temper or passion — not weakened by inordinate indulgence of the desires — with a sufficient gratification of the wants and wishes to give a foretaste of more perfect enjoyment, and to leave still more to aspire after, so that the capacity of gratification be not exhausted, — is that state which most successfully opposes the impression of endemic influence, which, assisted by the sensual indulgences of some, the ill-regulated passions and dispositions of others, and the carelessness of many, prove so destructive to human life.

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ENTERITIS. See Intestines — *Inflammation of*.

ENURESIS. See Urine — *Incontinence of*.

EPHELIS. Syn. — Ἐφήλις (from ἐπὶ, and ἥλιος, the sun). *Maculæ Fuscæ*, Plenck. *Epichrosis Ephelis et Lenticula*, Good. *Ephelides*, Alibert. *Ephélide*, Fr. *Spotted Discolouration of the Skin.*

Classif. — 10. *Gen.* 3. *Order*, 6. *Class*, (*Good*). 1. *Gen.* 8. *Order*, Maculæ (*Bateman*). I. Class, V. Order, (*Author*).

1. Defin. — *Discolourations of the skin, varying from a yellowish grey to a dark brown, and from minute points to large patches, and either scattered, confluent, or corymbose.*

2. I. Forms and History. — Hippocrates applied the term ephelis to the freckles produced by the sun; but he also extended it to the spots sometimes seen in the faces of pregnant females. This extension of the term was adopted by Oribasius, Aëtius, Actuarius, and Gorræus; and carried even much further by Plater, Sauvages, and Alibert. Other words have been employed by modern writers, as a designation either for ephelis generically, or for certain of its varieties, as will be stated hereafter; but, as this appears to have been the original one, I shall adopt it here. The change of colour characterising it, is not seated in the cuticle, but in the pigmentum which gives the hue to the skin. It seems, in some instances, connected with a deficient tone of the extreme vessels; and is very variable in its progress, occasionally coming on slowly, sometimes rapidly and extensively. It is often of long duration, or even permanent; and in other cases it soon disappears, either spontaneously, or after the application of some lotion. In itself, it cannot be considered to require medical interference; but certain of its forms are important, as symptoms of internal disorder. It may be divided into two species — the *lenticular* and *diffused*.

i. Lenticular Ephelis. Syn. — *Ephelis Lenticularis; Lentigo, Lenticula*, Auct. Lat.; *Ephelis Lentigo*, Sauvages and Todd; *Lentigo Ephelis*, Frank; *Pannus lenticularis*, Paget; *Ephélide lentiforme*, Alibert; *Freckles.*

3. This species is *characterised* by its fawn or brown colour, the spots being generally very small, and always under the size of a lentile, disseminated, or in clusters; and without any elevation of the cuticle, or attendant irritation. Dr. Todd has very properly divided it into two varieties — viz. that which is congenital or dependent upon the complexion, and consequently sometimes hereditary; and that which is caused by the sun.

4. *A. Congenite Ephelis*; Φακὸς, Gr.; *Tâches de Rousseur*, Fr.; *Ephelis Lentigo materna*, Todd; *Congenite Freckles.* — This variety occurs most frequently in persons of a very fair complexion, with a delicate skin, and yellowish or reddish hair; and sometimes in those with a very white skin, and dark hair and eyes. The spots are lenticular, persistent, and not confined to the parts exposed to the light; but are in some cases disseminated over the body. They frequently do not become very apparent until some time after birth, or even not until the child is five or six years old. The darkness of the discolouration varies as above (§ 1.), with the colour of the hair or eyes, and usually remains till old age.

5. *B. Solar lenticular Ephelis; Lenticulæ Solares; Maculæ Solares*, Plenck; *Ephelis a Sole*, Sauvages; *Lentigo æstiva*, J. Frank; *Summerflecken, Sonnensprossen*, Ger.; *Evanescent Freckles.* — This is a common lenticular discoloration, occurring in young persons, especially females,

during spring and summer, and disappearing in winter; and limited to parts exposed to the sun. Those who live in cities, or keep much within doors, are very liable to it when exposed to the sun and fresh air. The deepness of the discolouration generally varies with the colour of the hair; and the spots are most numerous in the face, particularly of those who go bareheaded, or insufficiently shaded from the sun's rays.

ii. DIFFUSED EPHELIS. — *Ephelis Diffusa*, Todd.

6. This species is *characterised* by the irregular, diffused, and large patches, which vary more widely in colour than the foregoing species; and are sometimes distinct, sometimes confluent. It has been made to comprise certain discolourations, arising from various causes, and presenting very different appearances. Some of these proceed from the direct action of heat and light, and others are symptomatic of an internal affection.

7. *A. Idiopathic diffused Ephelis* — *Ephelis diffusa Idiopathica* (TODD) — presents two very distinct forms; that caused by the heat of fires, and that by the sun and air.—(*a*) The blotches produced by artificial heat — *Ephelis ignealis* (SAUVAGES), *Ephelis spuria* (J. P. FRANK), *Lentigo ab Igne*, (J. FRANK), *Tâches de Brûlure*, Fr. — are generally seen on the legs, arms, and thighs of persons who sit near the fire, without any covering intervening between these parts and it. They are usually of a mottled character, and often assume a livid, or purple, or purplish red, colour, especially when the surface is exposed to cold. They are met with chiefly in females. — (*b*) *Sun-burn*, or the diffused and general discolouration — *Nigredo a Sole* (SENNERT), *Fuscedo Cutis* (PLENCK), *Ephelis umbrosa* (J. FRANK) — is merely the dark colour acquired by the skin after the protracted action of a high range of solar heat and atmospheric temperature, aided by the influence of the air, more especially sea air, and salt water.

8. *B. Symptomatic diffused Ephelis*, *Hepatizon*, *Maculæ Hepaticæ* (SENNERT), *Vitiligo Hepatica* (SAUVAGES), *Kelis fulvescens* (SWEDIAUR), *Chloasma* (the FRANKS), *Ephelis diffusa Symptomatica* (TODD), *Pannus Hepaticus* (PAGET), *Ephélides Hépatiques* (ALIBERT), *Tâches Hépatiques* (Fr.), *Leberflecken* (Germ.). — This form of discolouration varies much in shade, and in the size of the patches. It is usually of a pale dirty yellow, or of a yellowish brown, or a light tawny shade; or it passes from a saffron to a rhubarb hue. The patches are occasionally preceded by itching, are sometimes very slightly elevated, and then terminate in desquamation of the cuticle. They appear most frequently on the neck, over the regions of the liver and kidneys, on the groins, on the forehead, and sometimes about the mouth; and are generally distinct; but they usually run into each other as they extend, and often form groups or wide-blotches. When slightly elevated, and followed by desquamation of the cuticle, they nearly approach the *Pityriasis versicolor* of BATEMAN; and in this state are very dry and unperspirable, while the surrounding skin is soft and moist. They are either persistent, or of short duration. The transient form of this discolouration is very common in delicate females, particularly those whose uterine functions are disordered, and at the period of the catamenia. They occasionally appear suddenly, and disappear as speedily after a few hours; but they often remain a very considerable time, especially when they are connected with suppression of the menses (the *Chloasma Amenorrhœum* of J. FRANK), or with conception (the *Ephelis Gravidarum* of PLENCK, and the *Chloasma Gravidarum* of FRANK). — This form of ephelis is also sometimes connected with chronic disorders of the liver; but more frequently with those of the stomach and large bowels, and with those of the uterine organs. It is occasionally attendant upon hæmorrhoids; and is very readily excited in those liable to it, by vexation and anxiety of mind. It is also very generally connected with a state of the digestive organs, characterised by a craving appetite, and imperfect digestion and assimilation.

9. II. TREATMENT. — The *Lenticular Ephelis* is frequently a matter of serious consideration to the fair sex; and ingenuity has been often tortured for means of removing it. — (*a*) In respect of the *congenite variety* (§ 4.), the remark of CELSUS, as to the folly of those who attempt to remove it, is perfectly just. — (*b*) That variety, which is caused by the summer heat — the *solar lenticular ephelis* (§ 5.) — may be *prevented* by the use of veils and wide-brimmed hats; which will frequently assist its removal, when already produced. The articles — nostrums, cosmetics, &c. — which have been recommended for it, are beyond the possibility of enumeration; every perfumer, &c. being possessed of a panacea. Gently astringent and discutient lotions and poultices have been most commonly employed. From the time of HIPPOCRATES to the present, lotions and liniments with bitter almonds have been recommended. CELSUS advised a liniment of resin with a little fossil salt and honey; ACTUARIUS, one with vinegar, honey, and bitter almonds; and GEOFFREY, ox-gall, either alone, or with liquor potassæ. Dr. THOMSON mentions a weak solution of corrosive sublimate in the emulsion of bitter almonds; and Dr. BATEMAN, a drachm of either sulphuric or muriatic acid, in half a pint of water, in the form of lotion. Dr. J. FRANK prescribes the chloric acid in rose water (♏ xij.—xx. to ℥ vj.); and Dr. WITHERING, an infusion of horseradish in milk. Sour buttermilk is frequently employed in country places as a cosmetic wash. Besides these, a decoction of powdered lupines, or tares, or of the narcissus root, or of the seeds of the garden cucumber; also poultices prepared from these, and from a great variety of roots; have been recommended. The balsam of Mecca, with superacetate of lead, in the form of pomatum; washes with the juice of sorrel, or with lime-juice and camphor mixture; also this last, with nitrate of potash, or with milk of sulphur, or with Venetian soap dissolved in lemon-juice; rubbing the parts with a slice of lemon or sour apple; solutions of zinci sulphas, in emollient vehicles; and of the sub-borate of soda in rose water or orange-flower water (F. 334.); have also been employed, and frequently with success. Most of these are best applied at night, and washed off in the morning.

10. ii. The *Diffused Ephelis*, when proceeding directly from artificial or solar heat (§ 7.), disappears gradually upon the removal of the cause; and requires no further consideration. The *symptomatic states* are important only as symptoms of internal disorder; and, as being generally

connected with imperfect secretion, excretion, and assimilation, these functions should be assisted by mild, cooling, and alterative purgatives, light diet, and moderate exercise. Very small and frequent doses of blue pill or hydrarg. cum creta may be given with Castile soap and taraxacum, or with the aloes and myrrh pill, if the catamenia are scanty; or with ox-gall, in addition. The internal use of the *krėosote* may also be tried. I have prescribed it, in one case of this kind, with great benefit. Sulphurous mineral waters may also be taken; and lotions with the sulphuret of potash, or with nitre and camphor julap; or sulphuretted fumigating baths resorted to.

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EPIDEMICS. — *Epidemic Diseases*; 'Επιδῆμια, 'Επίδῆμος, 'Επιδήμιος (from ἐπὶ among, and δῆμος, people). *Epidemia, Epidemius, Epidemicus, Morbi Epidemici, Morbi Publici, Morbi Populares*, Auct. Lat. *Epidemie*, Fr. *Volkskrankheit*, Germ. *Epidemia*, Ital. *Epidemy, Epidemic Influence, Epidemic Constitutions.*

CLASSIF. — GENERAL PATHOLOGY.

1. EPIDEMICS are *such diseases as occasionally prevail more or less generally in a community, at the same time or season, and depend upon a common cause.* — They recur at uncertain periods; and continue to prevail for a time varying from two, three, or four months, to as many years, or even longer. When their spread is most extensive, or throughout countries differently circumstanced as to climate, &c., or when they are universal in their attack, they have often received the appellation of *Pandemic* (πανδήμιος or πάνδημος, from πᾶς, all, and δῆμος, people). When, together with their very general prevalence, they occasion a very great mortality, they have usually been denominated *pestilential* (see art. PESTILENCE). They are commonly acute and febrile, and often rapidly run their course. They appear at any season of the year; but most frequently in autumn, summer, and spring. They are distinguished from *endemic* maladies by the circumstance of these latter being occasioned by peculiarity of situation. But it should be recollected, that endemic diseases may be converted into epidemics of a very fatal kind, by those *influences*, either obvious or inferred, to which attention will be directed in this article; and which, acting either separately or in combination, modify the character, whilst they cause the prevalence, of disease.

2. I. CAUSES, &c. — The *Influences*, whence epidemics proceed, may be traced in many instances; and in others, particularly those that are pestilential, they cannot be inferred with the same degree of probability. Certain epidemics have manifestly arisen out of combinations of circumstances, the nature and operation of which admit not of dispute, whilst some have presented only certain elements of their causation, others being wanting to explain fully all the phenomena observed. — *A.* Amongst the most important elements of *epidemic influences*, are those *endemic sources* which are amply described in the articles CLIMATE (§ 3—32.); DISEASE — *Causation of*; and ENDEMIC INFLUENCE (§ 5.). These sources often perform very important parts in the causation of epidemics, upon the addition of some other cause, either manifest or concealed; endemics being sometimes the parent stock upon which epidemics are engrafted; the latter varying in character with the nature of the superadded cause, or causes, especially those which are about to be noticed. Several of these additional causes may consist merely of certain changes from the usual course of the seasons, which obtain in these localities; as prolonged drought, or protracted rains; and still more, the former following the latter; and particularly if conjoined with increased temperature. As long as the temperature continues low, very material changes in the state of the seasons may not be productive of any increase of disease in unhealthy situations, unless other causes come into operation, as infection, deficient or unwholesome food, &c. HUFELAND states that, in 1815 and 1816, in the north of Germany, the seasons were remarkably wet, and the temperature low, and yet the public health was very good; that intermittents and low fevers were rare, even in marshy localities; inflammations and rheumatism being the predominating maladies. In warm countries, however, protracted and heavy rains generally occasion epidemic disease, especially in low and marshy places, during the subsequent hot or dry season, or when great numbers of persons are crowded in a small space; and, moreover, impart to it an asthenic and infectious character. Of diseases originating in local sources, becoming infectious and epidemic, I could adduce several instances in modern times. LIVY (l. xxv. 26.) states, that, during the siege of Syracuse by Marcellus, 213 years B. C., a pestilence broke out in both armies; and that it occurred in autumn, and in a situation naturally unhealthy. "At first," he observes, "persons sickened and died, owing to the unwholesomeness of the place; afterwards the disease spread by infection, so that those who were seized were neglected, or abandoned, and died; or their attendants contracted the disease." He further adds, that the dead affected the sick, and the sick those in health, with terror and pestiferous stench; that the disease was more fatal to the Carthaginians than to the Romans, who, in this long siege, had become accustomed to the air and water; and that, in the same year, an epidemic visited Rome and the adjoining country, which was remarkable rather for passing into chronic affections, than for the mortality it occasioned. Although some of the sources of endemic disease may, by the aid of concurrent causes, as in the instance now quoted, give rise to epidemics, yet pestilential epidemics otherwise originating, as in infection, have sometimes spared places which have seemed to abound the most in certain causes of insalubrity; but this has occurred only when

those places have emitted a powerful stench, and ammoniacal vapours, or other strong odours, which have either counteracted, or neutralised, the exhalations or miasms which have spread the infection.

3. *B.* The *seasons* have a very remarkable influence upon certain epidemics, as those of yellow fever and plague; and but little on others, as pestilential cholera, influenza, &c. As respects those epidemics which are less universal and fatal, the influence of the seasons is more or less manifest.— In *spring*, various forms of angina, croup, bronchial affections, inflammations of the lungs and pleura, catarrhs, rheumatism, hooping cough, tertian or quotidian agues, and the febrile exanthemata, as measles, &c., are usually most prevalent.— In *summer*, certain of the above diseases will often remain, with continued fevers of various forms, erysipelas, smallpox, stomach and bowel complaints, &c. — In *autumn*, the diseases of summer either continue, or become more prevalent, especially cholera, dysentery, and colicky affections; and quartan or irregular agues, remittents, sore throat, scarlatina, inflammations, or obstructions of the abdominal viscera, &c. are also frequent. — In *winter*, inflammations of the thoracic and respiratory organs, rheumatism, and low or typhoid fevers, are most common; and in close or crowded places, infectious effluvia, either from the sick or from accumulated filth, are readily generated, when the air in heated apartments becomes stagnant. **Hippocrates** had remarkedt hat, when the seasons are regular, diseases are also more regular in their course; and, unless during the prevalence of epidemics, the observation appears just.

4. *C.* The *weather* has a considerable influence on the prevalence of the more common diseases. Protracted droughts are unfavourable to pulmonary diseases, with the exception of bronchorrhœa, and frequently excite inflammations and inflammatory fevers. During, and soon after, very wet seasons, gastric, remittent and intermittent fevers, catarrhal and rheumatic affections, dysentery, diarrhœa, and sore throat, are often epidemic. The frequent recurrence, or the continuance, of high and cold winds, occasion catarrhal, pectoral, inflammatory, and rheumatic diseases; and warm or hot winds induce remittent and bilious fevers, cholera, ophthalmia, &c. Calm humid states of the air promote the spread of continued fevers, and all infectious and contagious maladies; and similar conditions of the atmosphere, conjoined with great heat, favour the prevalence of adynamic and malignant fevers of a continued or remittent type; whilst very hot and dry seasons give rise to synochal and ardent fevers, to bilious remittents, cholera, and inflammations of the liver, stomach and bowels.

5. Although the states of the atmosphere here enumerated, very frequently produce the effects ascribed to them respectively, yet other causes aid their operation. Writers, from **Hippocrates** downwards, have attributed too much to irregularities and sudden vicissitudes of season in the production of epidemics, more especially of those which are very general or pestilential. I believe that this cause is instrumental chiefly in augmenting the number of cases of the diseases common to a country; and that it is very seldom the only, or even the chief, source of wide-spreading or pestilential maladies, although it may aid their generation and diffusion. On this point I cannot agree with Dr. **Hancock**, M. **Fodéré**, and some other modern authors. That this dictum of Hippocrates was not altogether believed, even in ancient times, may be inferred from the frequent exceptions to it adduced by historians and medical writers. **Tacitus** (*Annalium*, l. xvi. 13.), when noticing the epidemic that raged at Rome in the year 68, states, that there was no irregularity of season, or weather, to account for it. The plague that prevailed so long, and spread so generally, between the middle and end of the sixth century, and which has been fully described by **Procopius** and **Evagrius**, who were witnesses of it, was in no way dependent upon irregularity of season, but was evidently propagated by infection. The following remarks of **Evagrius** are, according to the experience of every candid observer, perfectly characteristic of an infectious pestilential epidemic: — "Some perished by once entering into, or remaining in, the infected houses; some, by touching the sick. Some contracted the disease in open market: others, who fled from infected places, remained safe; while they communicated the disease to others, who died. Many who remained with the sick, and freely handled the dead bodies, did not contract the disease." (*Eccles. Hist.* l. iv. cap. 29.) The pestilence called the Black Death, which visited nearly all the then known world in 1347, 1348, 1349, and 1350, was equally independent of irregularity of season, or deficiency of food. **Parker** (*Antiq. Brit.* p. 360.) states, that it first appeared in the south of England, about Christmas, 1348, and amidst the greatest abundance of provisions. **Thuanus** and **Riverius**, when noticing the epidemic that broke out in France in 1580, remarked, that the crops that year were plentiful, and the sky serene; so that it was thought that the disease was produced rather by the influence of the stars than by the malignity of a corrupt air. **Webster** (*On Epidemic Diseases*, vol. i. p. 323.) admits, that the summer in 1665, in England, when the plague commenced in London, was very temperate, the weather fine, and the fruits good. All the writers of the day agree that no cause of pestilence could be observed in the states of the seasons. The epidemics of our own days also prove that, although irregularities of seasons and weather, particularly in the endemic sources of disease, may aid in the diffusion of pestilential maladies, or give rise to increased prevalence of the common diseases, they are by no means amongst the chief causes of the former.

6. *D.* In connection with, and often resulting from, irregularity and inclemency of seasons, *unwholesome* and *deficient food* sometimes performs an important part in the production of epidemics, — a fact which seems to have been well known and guarded against by the inspired lawgiver, **Moses**. In *Deuteronomy* (ch. xxviii.), the Israelites are warned against transgressing his laws; and are threatened, as a consequence of disobedience, with the diseases of Egypt — the botch, the scab, and the emerods; maladies known at present, by the names of elephantiasis, leprosy, and plague, respectively, to prevail in that country; and in *Numbers* (ch. xi.), they are stated to have been seized by pestilence from eating a great quantity of the flesh of quails, which had fallen in surprising numbers around their camp, after having been

long destitute of animal food, — a consequence of the circumstances in which they were placed, and of the unwholesome nature of their food. Fodéré states that, during 1815, 1816, and 1817, in several parts of Italy and France, the inhabitants were oliged to have recourse to such roots and herbs as they could procure, the grain having been remarkably scarce and of bad quality; and that, in consequence, scurvy, diseases of the skin, and malignant and infectious fevers, became very prevalent among the lower classes. A similar circumstance was observed at Marseilles in 1812 and 1813; and in Ireland, on several occasions since the commencement of the present century; typhoid and low fevers, and dysentery, being the most prevalent results. Diseased or unripe grain, or alterations which it may have undergone in granaries, and the admixture of seeds which are injurious with it, are also very influential agents of disease. In years of scarcity, both grain and roots are often prepared for food before they have acquired due maturity; and in that state derange not merely the alimentary canal, but also the nervous and circulating systems, at a period when want and debility have rendered them more than usually susceptible of disorder. Malignant fevers, dysentery, convulsive affections, scurvy, ergotism, raphania, &c. have, in numerous instances, proceeded chiefly from diseased or altered grain. M. Fodéré mentions, in addition to the more specific effects of ergoted rye (see Ergotism), its causing abortions to become epidemic.

7. (*b*) Flesh of animals, and fish, when diseased, or tainted, are not infrequently productive of most dangerous maladies. Epidemics often commence among the lower animals; especially horned cattle and sheep; and the use of the diseased flesh may occasion malignant diseases among the human species. Whether or not infection may be conveyed from these animals whilst alive, to man, during epizooties, has not been ascertained, nor, indeed, has the question been fully entertained. That it can be thus conveyed in respect of some maladies, has been proved in modern times. Fodéré adduces a very convincing proof of the ill effects of diseased flesh in the production of dysentery and typhoid or adynamic fevers. At a period when the French troops, in the late war, were in want of provisions, over-driven cattle, some of them diseased chiefly from this circumstance, were killed before time was allowed them to recover their fatigue. Their flesh was remarkably red, and passed quickly into decomposition. Most of those who partook of it were seized with febrile and malignant dysentery. During the French war in Prussia, Germany, and Italy, the sound meat and grain were often carried off by the victorious armies, leaving the unhealthy animals, &c. to the inhabitants, who became, from the nature of their food, the prey of epidemic fever and dysentery. The blood and viscera of these animals are generally most noxious, from being especially affected; and it is fully established that these parts become principally diseased in the persons who are seized by these maladies from this cause. The muscular flesh of cattle attacked by an epizooty much sooner presents appearances of alteration after death, than that belonging to such as are healthy. It cannot, therefore, fail of being productive of disease in those who partake of it, notwithstanding the effect of cookery in counteracting its noxious tendency.

8. (*c*) The agency of unripe, stale, or otherwise unwholesome fruit, and of stale and diseased fish of any kind, in the production of certain epidemics, is fully shown in the article Disease (§ 46.), and in the sequel. — (*d*) The operation of unwholesome water, although especially manifested in the causation of endemic distempers, is also productive of those that are epidemic, particularly on occasions of inundation of the sea; as observed on several occasions in Holland, Italy, and many places within the tropics. — (*e*) M. Fodéré states, that during a tour lately made in the Low Countries and French Flanders, he learnt that functional and organic affections of the stomach were sometimes epidemic there, from the use of spiced spirits and cordials, and the practice of adding lime and alkaline substances to the beer to prevent it from becoming acid. The well-known exclamation which Shakspeare puts in the mouth of Falstaff would lead to the inference that lime was very generally used, in the sixteenth century, to remove or prevent acidity in the white wines then drunk. This, however, is a cause rather of endemic than of epidemic diseases. The ill effects of adding deleterious narcotics to beer — even to the small-beer — in this country, although satisfactorily shown in the production of a great variety of disorders, chiefly of the digestive organs and nervous systems, seldom manifest themselves in a form so specific as to be recognised as epidemic or even endemic.

9. *E. a.* Several writers on the epidemic appearance of certain diseases, finding that neither of the foregoing description of causes could account for them, have had recourse to various supposititious agents, of the nature of which they are entirely ignorant, and even the existence of which they have not been able to demonstrate. These agents have been supposed by some to be a malaria or principle of a peculiar kind, generated by the prolonged action of the sun, or by heat, upon low absorbent soils, and exerting a very noxious operation on the human constitution; and by others, to be a peculiar aura, or fluid, which has escaped from more deep-seated parts of the earth; and, although altogether incognizable to the senses, yet most destructive to human life. The former opinion is maintained by many, especially by Jackson, Ferguson, Devèze, O'Halloran, Dickson, Robertson, &c.; the latter, also, by a numerous body of physicians. Noah Webster endeavoured by most laborious research to connect the appearance of epidemics with volcanoes, earthquakes, and comets, — supposing that they all depend upon the same cause, or that the changes produced by the latter give rise to the former, either directly by their action on the human frame, or indirectly by blighting the productions of the earth, and thereby deteriorating the chief articles of food. In struggling through a dry and meagre enumeration of epidemics — slight as well as pestilential — furnished by this writer, the reader is often amused by the attempts to connect an influenza, or some other epidemic, in Europe, with an earthquake in America or in Asia, or with a comet that had appeared two or three years either previously or subsequently, or with some such phenomenon, as the fall of meteoric stones,

10. *b.* Other authors have ascribed an unusual prevalence of disease, or the appearance of pestilential epidemics, chiefly to the states of electricity in the air, and on the earth's surface. That certain conditions of this agent should affect the animal economy, and either predispose it to be infected by the exciting causes, or of itself be a principal cause, of disease, is probable; but we have no direct proof of any connection between epidemics and known changes in the electrical states, either of the air, or of objects on the earth's surface; and even granting that such connection exists, there is no evidence that this agent can produce the morbid effects ascribed to it. It is impossible to reconcile the modes in which epidemics are observed to diffuse themselves, or the peculiar and novel characters they often assume, or the very opposite physical circumstances in which they occur, merely with changes in the electric fluids, often of inappreciable and insensible kinds. Indeed, experience rather shows that the body may be made the medium of a very energetic electrical, or electro-motive, action, without any injury being inflicted on it; and it is only when a very powerful and very manifest current of either the negative or positive electricities strikes, or passes through it, that life is thereby in any way affected.

11. *c.* Numerous instances have occurred of the lower animals participating in the fatal effects of an epidemic constitution, and they have been adduced by modern authors as proofs of the existence of a noxious effluvium in the air, however it may have been generated. Thus it has been observed, that epizooties have preceded the prevalence of fevers; that catarrhal affections in horses have been followed by influenza; that birds have either forsaken the vicinity of a town ravaged by a pestilence, or have fallen dead when flying over it; and that numerous species of animals, particularly domestic animals, have died in houses visited by pestilential maladies. These phenomena have been adduced as proofs of the existence of some one of the agencies placed under this head. Without disputing their actual occurrence, or attempting to reduce them to their exact dimensions, from which they had been exaggerated for the purposes of argument, I will receive them as they have been described by those who have adduced them in support of their views. — 1st. As respects epizooties in connection with epidemic fevers, Lancisi, Ramazzini, and still more modern writers, have furnished much information. It has very frequently been observed, when the prevailing fevers have been an exaggerated form of the endemic of the country, or when endemic sources have been manifestly concerned in their causation, that the lower animals, especially horned cattle and sheep, which derive their sustenance chiefly in places productive of malaria, are the first to experience its effects, when it is more than usually active or concentrated. This is nothing more than what might be inferred *à priori*. We know that remittent and continued fevers, in various forms, are frequently epidemic, especially in marshy countries in the south of Europe; are chiefly dependent upon local sources, aided by heat, crowding, imperfect ventilation, neglect of cleanliness, and the state of society; and are often either preceded or accompanied by epizooties. Such occurrences are as old as the records of history extend; and have been adverted to in the Books of Moses, as well as in those of the Prophets. Homer has signalised the connection, and Eustathius and Spondanus have explained it, in their commentaries on the Iliad, as satisfactorily as any philosopher of the present day. Eustathius, the celebrated critic of the twelfth century, ascribes the disease that broke out in the Grecian camp, in the tenth year of the siege of Troy, to immoderate heat and gross exhalations: and De Sponde, or Spondanus, as he is commonly called, conceived the circumstance of the mules and dogs having been affected before man, to have been owing to their natural quickness of smell, rendering the exhalations sooner perceivable and operative; and to their feeding on the earth with prone heads, whereby effluvia are more readily inhaled, and before they rise so as to affect man, or become diffused in the air.

12. A connection similar to the above, and evidently proceeding from the same sources, especially in warm or dry seasons, consequent upon the inundations of low grounds or marshes, is mentioned in various places by Livy. That the epidemics, which were thus consequent upon or attended by epizooties, were of the nature I have contended for, may be inferred from the following notice he has recorded of an epidemic fever which was remarkably destructive in the year of Rome 576: — "Pestilentia, quæ priore anno in boves ingruerat, eo verterat in hominum morbos. Qui inciderant haud facile septimum diem superabant: qui superaverant longinquo, maxime quartanæ implicabantur morbo. Servitia maxime moriebantur; eorum strages per omnes vias insepultorum erat. Ne liberorum quidem funeribus Libitina subficiebat. Cadavera intacta a canibus ac vulturibus, tabes absumebat; satisque constabat nec illo, nec priore anno, in tanta strage boûm, hominumque, vulturium usquam visum." (L. xli. 21.) Here the commencement of the disease amongst the cattle, its subsidence into the intermittent type, its greater prevalence in the lowest classes, and the absence of birds of prey from the infected atmosphere, are proofs — 1st, of its having originated in malaria, and possessed the characters distinguishing this class of fevers; and, 2d, of the effect of the contaminated air and diseased bodies on animals of prey. The destructive epidemic that ravaged Rome in the year A. D. 187, and many parts of Italy, was attended, rather than preceded, by a disease in cattle. Herodian (L. i.) ascribes it to the great concourse of people assembled from all parts of the earth, and to an unfruitful year, and consequent famine, — causes most likely to generate infection, particularly when aided by others which are seldom absent under such circumstances. Although this connection of epizooties and epidemics may be explained as was attempted by Eustathius and Spondanus, yet it is not improbable, that cattle confined together in a state of disease will generate an effluvium, remarkably injurious to man; that the use of the flesh of diseased animals, as may be inferred to have been the case in the epidemic last noticed, will have a similar effect; and that, when aided by other noxious agents, both these causes will occasion an infectious malady, which will spread with great rapidity and mortality under the circumstances

in which these epidemics were observed. The facts already adduced (§ 7.), support this inference; the following further tend to confirm it: — Livy, Dionysius of Halicarnassus, and Orosius mention a destructive pestilence which Rome and its territory experienced 464 years B. C. It seems to have occurred in autumn, and to have arisen from the crowds of countrymen and herds of cattle received within the walls of the city. "Ea colluvio," Livy remarks, "mixtorum omnis generis animantium, et odore insolito urbanos, et agrestem, confertum in arcta tecta, æstu ac vigiliis angebat, ministeriaque in vicem ac contagio ipsa vulgabant morbos." (L. iii. 6.) The circumstance here so very explicitly stated, the vicinity of the Pontine marshes, and the state of the surrounding country admitting of inundations from any unusual rise of the Tyber, fully explain the occurrence of this epidemic. About ten years afterwards, another epidemic ravaged Rome, and was connected with famine and disease among cattle. In the year of this city 325, or twenty-five years subsequently, a remarkable drought and famine visited the Roman territory, the springs of water even having been dried up. Livy states, that "multitudes of cattle thronged round the arid fountains, and perished with thirst. Diseases followed, first invading cattle, and infecting the rustics and the lower classes of people, and then extending to the city." (L. iv. 30.) Dr. Hodges states, that the plague of London in 1665 was preceded by sickness among cattle, and that bad meat was consequently sold to the poor so cheap that they fed upon it to excess,—a circumstance that could not fail of predisposing them to be affected by its principal causes.—During the epidemic of New Orleans in 1819, cattle, sheep, and horses were affected, evidently owing to the concentrated malaria concerned in causing the disease.

13. 2d. It has been supposed that the death or absence of birds during an epidemic is evidence of the dependence of such epidemic upon terrestrial exhalations. But it should first be ascertained at what period this phenomenon occurs; for if it precede the disease in the human species, then it may be inferred that these exhalations are concerned more or less in causing that disease. But if it take place during the course of the epidemic, then it may arise from the infection of the atmosphere by the exhalations from the sick; the feathered creation, owing to the extent of their respiratory organs, and to their relatively large consumption of air, being very susceptible to changes in this fluid. I believe that the phenomenon in question has occurred only during *pestilential* epidemics, where the sickness and mortality have been very great; and that it has proceeded from this latter cause. This is proved by the circumstances in which it has been observed. Thucydides states, that, during the plague of Athens, birds that prey on human flesh entirely disappeared. Analogous facts were noticed by Diemerbroeck during the plague of Nimeguen; by Sir J. Fellowes, during the epidemic of Cadiz; and at Dantzic in 1709, according to Short. It has likewise been remarked that domestic animals have died, during these epidemics, similarly affected to man. In these cases, the infection has manifestly extended from the latter to the former; the air having been contaminated by the effluvium exhaled from the sick.*

14. *F.* The *putrefaction of animal substances* has been supposed by many to occasion disease in those who come within the sphere of the exhalations thus produced, and even to generate a malady which has become infectious, and has, partly thereby, and partly from other concurring causes, prevailed to an epidemic, or even pestilential, extent. It is not, however, merely dead animal bodies, or considerable collections of putrid matter, but also heaps of filth exposed in the streets, or animal excretions and exuviæ, subjected to a warm and stagnant air, and neglect of domestic and personal cleanness, that are thus injurious. These latter may be less energetic agents than the foregoing; but they more frequently exist, and are more common concurrent causes. The injurious effects, however, of putrefying animal substances have been denied by Dr. Bancroft and others, by a species of argumentation more specious than solid — by a kind of medical special pleading, of which we have had more, since the commencement of this century, than is consistent either with facts or with the advanced state of general science. Animal substances in a state of decay will produce effects, varying with the temperature and humidity of the air, with the concentration of the exhalations proceeding therefrom, and with the state of individuals, or of the community, exposed to them. A candid appreciation of the facts which have occurred to most experienced observers, in connection with those recorded by creditable writers, will, I believe, warrant the following inferences: — 1st. That in low ranges of temperature, the emanations from putrid animal substances will seldom be productive of marked effects, unless they accumulate or become concentrated in a stagnant atmosphere — unless they be assisted by

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* The above occurrences were common in the pestilential epidemics that have visited the south of Spain since the commencement of the present century. The following illustrative facts have been observed by myself: — Some years ago, malignant puerperal fever, proceeding from a contaminated state of the air in the wards of a then crowded and ill-ventilated lying-in-hospital, had attacked nearly all the patients. The cat kept in the house died at that time, soon after having had kittens, with all the characteristic symptoms of that malady. During the prevalence of cholera in London, in 1832, a parrot, in the apartment of a person who had this disease, died with all the symptoms of it. Due precautions having been used to prevent its extension to the rest of the family, no one else was affected by it. Some other birds, in different parts of the house, escaped. That a very sensible effluvium is given off from the sick, and long adheres to the clothes of the attendants, is proved by the following occurrence: — During the summer of 1833, I was called, by Mr. Faxon, to a patient violently attacked by pestilential cholera, at a considerable distance from my house. I took occasion, directly after one of my visits to this patient, to call upon two relatives of my own, residing about a mile and a half from the house of the patient; and, although I walked that distance, they both, upon entering the room, enquired respecting the peculiarly unpleasant odour I had brought in my clothes. I professed perfect ignorance of its existence, and of any cause for it. They had no idea, nor do they even now know, that I had been visiting a person in cholera. They were both seized with this disease on the following day, but recovered. No one else in the house was affected by it; and no other cases occurred in the vicinity, or within a mile of them in every direction, for long afterwards. This fact will, of itself, explain several important circumstances connected with the spread of infectious epidemics, and show the difficulty of accounting for the source or manner of infection; although infection, either direct or mediate, has, as in these cases, undoubtedly taken place.

imperfect ventilation; — 2d. That the combination of these exhalations with those emitted by decayed vegetable matter, and by deep absorbent soils, gives rise to effects of greater severity than those occasioned by either operating separately; and that the intensity of these effects will depend upon the temperature, humidity, and stillness of the air, and other concurrent circumstances; — 3d. That emanations from dead animal matter, in the various states in which it is met with, are capable of causing, even of themselves, serious effects, as shown in the article DYSENTERY (§ 23.); and that, when aided by high ranges of temperature and humidity, they are often productive of extensive disease, which usually assumes, especially in a crowded population, and calm atmosphere, infectious properties; — 4th. That even when they have not been the chief element or cause of the epidemic constitution, they have been, not unfrequently, concurring agents.

15. It is recorded in the *Magdeburgh History*, that, in the year 394 or 395, swarms of locusts covered Judea; and were driven by the wind into the sea, and washed on the shore of Palestine: they filled the air with fœtid effluvia, which occasioned pestilence among men and cattle. In this case, the high temperature of the country, very probably famine — the frequent consequence of swarms of these insects — and other causes, concurred in the production of this epidemic. It is likewise stated in the same history, that swarms of locusts covered a great part of France in 874, and were driven by the winds into the British Channel; and, having been washed on shore, caused such a stench and sickness, aided by a famine, as to destroy about a third of the inhabitants of the French coast. I have stated that the *dysenteries* (see that article), which have been very generally epidemic immediately after very destructive pestilences, have been occasioned chiefly by the exhalations proceeding from the immense number of dead bodies, and by the presence of animal matter in the water. It is more, even, than probable, that pestilences are perpetuated in large cities from this circumstance; and that the prolonged epidemics, of which Rome, in her rise, in her acmé, and in her decay, was so frequently the seat, were partly owing to this cause, which neither burning nor burying the dead bodies could prevent. During the very prolonged pestilence that ravaged Rome in 262 and 263, the air is described by EUSEBIUS to have been so corrupt, as to form on the surface of objects a mould or tabid dew, such as proceeds from putrid bodies: — "Ros quidam tabidus e cadaveribus putridis;" — or, as CEDRENUS expresses it, "Ros saniei mortuorum similis apparebat."

16. G. *Infection and contagion* are amongst the most important agents in the spread of certain epidemics; but great misapprehension has existed, as to the extent of their influence, the exact parts they perform, and their mutual connection. Many writers have erred remarkably in viewing epidemic diseases as being necessarily infectious, and even contagious; and others, in considering them entirely devoid of infectious and contagious properties. The importance of determining in how far they possess either property, and are diffused in consequence; and the great interest of the subject, in medical, commercial, and political points of view; have given occasion to much and to warm discussion — a great part of which has not been calculated to advance the cause of science, or to elevate the medical character in public estimation. The subject of contagion, in all its relations, is fully discussed in the article INFECTION. I can, therefore, only allude briefly to a few of its connections with epidemic maladies.

17. 1st. A foul air may be generated by the crowding of many into a small space, even in health, but more especially in a state of disease, as in hospitals, &c.; or by the presence of only a very few in the same apartment, if their ailments be attended by copious discharges, as in puerperal and dysenteric cases, &c,; and this air may infect those who breathe it in a state of predisposition, with fever, dysentery, &c.; persons thus infected, communicating the disease to others similarly predisposed, and under the circumstances about to be stated (§ 18. 2d.). Thus I have seen puerperal fever generated in the wards of a lying-in-hospital, from the air having become vitiated by the discharges; and nearly all the females, who have been exposed to the action of the contaminated air soon after delivery, affected by it; the disease being, moreover, conveyed from one patient to another by means of the accoucheur. Foul and phagedenic ulceration, hospital gangrene, erysipelas, dysentery, inflammation of veins, &c. may also be produced, and become even epidemic to a certain extent, in this way.

18. 2d. Disease may take place sporadically, or from local causes, and owing to various circumstances acting either in close succession or coëtaneously; the circulating and secreted fluids, and even the soft solids, may be so changed during its course, as to emit an effluvium, contaminating the surrounding air, and thereby infecting many of those who breathe this air in a sufficiently contaminated state; and thus it will be propagated to several, and from those to others — especially under favourable circumstances of temperature, humidity, electrical conditions, and stillness of the air, and of predisposition on the part of those who come within the focus of infection. Thus disease may become *infectious and epidemic*, aided by the constitution of the air and other circumstances; and, after a time, cease and entirely disappear, with the circumstances which combined to propagate it.

19. 3d. A person may be either infected in the manner now stated, or seized by a malady which always evinces infectious properties under circumstances favourable to their development, as typhoid or adynamic fevers; or by one obviously contagious, and propagated by a palpable virus, as small pox, &c.; and be removed to a district where the physical conditions, aërial and terrestrial, as well as the states and manners of the inhabitants, favour its spread to others; or the morbid miasm or matter may be conveyed, by means of some inanimate substance embued with it, to a distant place thus circumstanced, and the disease be there propagated for a time, then subside, entirely disappear, or again break out, according to the concurrence or disappearance of one or more of the causes aiding in its diffusion. In these cases, the disease becomes *epidemic from in-*

fection, and generally disseminates itself gradually at first, but with rapidly increased celerity as its victims accumulate, until either it exhausts the numbers of those predisposed, or the circumstances favouring it disappear, and others occur counteracting its diffusion.

20. 4th. The same disease may appear simultaneously in a number of persons distant from each other, and between whom no communication has taken place; and affect a great part of a community—those who are secluded, as well as those who mix with the rest of their species; and it may disappear after a time, without sufficient evidence being furnished of its possessing either infectious or contagious properties. Disorders thus appearing may be termed *simply* epidemic.

21. 5th. Disease may first appear as now stated (§ 20.); but, in certain situations and circumstances, as in low, filthy places; in crowded and ill-ventilated streets and houses; in stagnant, moist, impure, or other states of the air; from the confinement of a number of sick in small space; want of cleanliness, or bad habit of body; in states of physical and mental depression, &c.; may assume a more malignant character, and emit an effluvium, which will become either a superadded cause concurrent with apparent or concealed antecedent causes, in diffusing the malady, or a principal agent of infection, or possibly even of contagion, to which the others are entirely subsidiary. In this case, the epidemic is consecutively infectious; and a person, who, being infected, removes into a district which the disease has not yet reached, may, under the circumstances, and in the way stated above (§ 18, 19.), propagate it there: but if these circumstances do not exist, this occurrence will not take place; and thus the epidemic will be limited to the place where the constitution of the air, and the conditions, physical, social, and moral, of the inhabitants, combine to favour the operation of such infectious effluvia as may be generated and accumulated around the sick.

22. 6th. Certain diseases may appear, either in a sporadic or endemic form, or in a simply epidemic state (§ 20.); and, owing to the manners and circumstances of the community, be propagated only to members of the same family, or to those in very intimate communication with the affected; for, although commonly observed in the above forms, and, in ordinary circumstances, without evincing any infectious property, they have sometimes been transmitted to those who either sleep with, or inhale the breath of, the person affected, as in croup, and in some other diseases of the respiratory organs; or live in the same apartment with him, as occasionally remarked in respect of erysipelas, dysentery, &c.

23. Epidemics present themselves in one or other of these modes, according to the combination of the elements or agents co-operating in their production; and to the influence of these elements, either in predisposing the system to, or in directly exciting, certain trains of morbid action. Thus it will be seen that epidemics are either—(*a*), not manifestly infectious (§ 20.); (*b*), or conditionally infectious, owing to the co-operation of certain circumstances (§ 18.); (*c*), or primarily infectious and contagious,—the epidemic constitution, or state of the atmosphere, &c. favouring their general diffusion. This last class, or that primarily and generally infectious, is characterised—α. by the specific forms which the diseases comprised in it assume; β. by their nearly determinate duration; γ. by their propagation under very different circumstances, although favoured by various atmospheric conditions; δ. by their little disposition to relapse, or return; ε. and by their affecting, with few exceptions, the system only once. From the foregoing, also, the fact may be explained, that the same disease, when occurring sporadically, often presents no infectious properties; but, when prevailing epidemically, generally evinces them more or less remarkably; the states of the air, the circumstances of the community, physical, social, and moral, and various other agents contributing either to the development of new properties, or to the manifestation of those which would have been otherwise latent or concealed.

24. *H.* The last element in the causation of epidemics, to which I shall briefly allude, is *mental depression,* in every form it can present itself. This, although a source of predisposition, rather than an element of the epidemic constitution, is one of the most influential causes in the spread of disease, particularly those that are pestilential. An army, during the success of a campaign, seldom presents more than sporadic cases of disease, unless they are subject to great privations, and even then, little illness may occur. But, during reverses, panic, disappointment, &c., particularly if such reverses be attended by their usual concomitants—by crowding, privations of all kinds, inattention to cleanliness, exposure to night air and malaria, &c.—epidemic sickness is a common result. The fear of the disease, amounting often to panic, which is very generally experienced upon the approach or breaking out of an epidemic, is not only one of the causes of its rapid diffusion, but also of the suddenness and fatality of the attack, usually remarked at its accession. The mental distress so generally diffused in the seats of war, is a very powerful concurrent cause of the diseases which are commonly attendant upon it; and this, as well as other contingencies, will, at least partly, explain the prevalence of sickness after earthquakes, in places where they have been most severely felt.

25. *Conclusions.*—*a.* It may be inferred from the foregoing, that, although any individual element of epidemic causation will of itself be insufficient for the production of the effects observed, more especially of wide-spreading or pestilential diseases, a concurrence of several, in various grades and forms, aided by a number of incidental circumstances, must, in the present state of our knowledge, be viewed as their true sources; — that neither infection, although the most influential agent, perhaps; nor terrestrial malaria, nor mineral vapours—the favourite agent of SYDENHAM, and of many recent writers; nor exhalations from dead animal matter; nor intemperature of season or weather; nor famine, scarcity, or unwholesome food; nor crowding of the living — the healthy, or the sick; nor filth; nor stillness, humidity, warmth, or other conditions of the air; nor depressing motions and passions; nor any physical, social, or moral vicissitude; will, singly, account for epidemics: but that the association of several, or of two or more, of these causes, in

various grades of predominance, is necessary to their occurrence, diffusion, and continuance.

26. *b.* That miasms generated by the sick in one or other of the modes stated above (§ 17, 18. 21.), and accumulated in a close air, or transmitted by means of fomes, or contagion by a palpable virus, are either primarily or consecutively (§ 19.) concerned in the production, or in the propagation, of all fatal, malignant, wide-spreading, or pestilential epidemics.

27. *c.* That the appearance of epidemics is owing to the rare concurrence of the elements just enumerated, and probably of others of less importance, whether acting as specific, exciting, or predisposing causes; and that infection, in any of its forms, will seldom or never give rise to the epidemic prevalence of a malady, unless it be aided by one or more of the above elements of an epidemic constitution, more especially such as occasion a stagnant and impure state of air, and depress the spirits of, or otherwise predispose, the community.

28. *d.* That the specific form which an epidemic assumes, depends upon the association of the causes in which it originates, and which favours its diffusion, but more especially upon the infectious miasm concerned either primarily or consecutively in producing it; and that its character may change, and become either more virulent upon the addition of a new cause or element, or less so on the abstraction of one or more. Thus, small-pox, scarlet fever, true yellow fever, pestilential cholera, plague, typhoid fevers, the adynamic forms of dysentery, and measles, require a concurrence of causes to their epidemic appearance, that will act chiefly in predisposing the community to be impressed or affected by their respective infectious miasms; these miasms being their specific exciting causes, without which they could not continue to present the same forms, or each one could no longer generate its like. When the predisposition to be affected by the specific miasm — whether such predisposition be inherent in the frame or intrinsic, or temporarily induced by external agents, as the state of the air, or other extrinsic influences — is limited to a very few of those coming within the sphere of its operation, then sporadic cases only of the malady will present themselves: but when, in consequence of the combined action of several causes, or of a peculiar but unknown state of air, the predisposition is more or less general, the disease will become epidemic; the nature, severity, and number of these causes, whether extrinsic or intrinsic — whether physical, social, or moral — determining the intensity of its character, as well as promoting its diffusion and continuance, until it exhausts itself, by affecting all those predisposed, or some change takes place which abstracts, or otherwise changes, the principal concurrent and predisposing agents. The salutary results sometimes observed during epidemics, from a violent storm, are obviously occasioned chiefly by the dissipation of an infected atmosphere; and those, as yellow fever, which require a high temperature as a principal concurrent cause, subside upon the setting in of cold weather.

29. *e.* The history of epidemic diseases, more especially small-pox, plague, yellow fever, pestilential cholera, hooping cough, and exanthematous fevers, show that, although the concurrence of the causes enumerated above, are commonly concerned in their production as epidemics, they, nevertheless, sometimes rage violently without such concurrence having been observed. This can be explained only by inferring either the presence of these causes in a slight grade, or the existence of some quality in the atmosphere, independently of them, favouring the propagation of disease, or predisposing the community to infection: for, although measles become epidemic usually in winter and spring; and scarlet fever in summer and autumn, as observed by SYDENHAM; yet the same association of circumstances, at these respective seasons, does not always give rise to them; and they sometimes appear at other times, and even prevail very extensively. It is notorious, also, that small-pox, before either inoculation or vaccination was introduced, was often propagated with difficulty at one time, and with remarkable readiness at another, and yet the concurrent circumstances were sometimes apparently the same; and, although the usual epidemic agencies generally favoured its spread, yet it occasionally became extremely prevalent without their apparent aid. It must, therefore, be inferred, that there is a state of air either arising out of some of those changes insisted upon above, in peculiar but not manifest states of association, or consisting of an entirely unknown quality, that is sometimes instrumental in spreading infectious or epidemic maladies. The history of the progress of pestilential cholera fully illustrates this inference.

30. *f.* As the association of causes and circumstances, already specified, and a peculiar or unknown state of the air, are mainly concerned in the rapid diffusion of disease; and, as it is evident that these are but occasionally, although often suddenly, formed, the epidemic spreading with a rapidity in proportion to the suddenness and the degree of the change; so it may be inferred, that the return to the natural or healthy state of things may be equally sudden with the departure from it, and the epidemic abate with proportionate celerity. Much, however, should be attributed to the circumstance that, when an infectious epidemic occurs, it speedily seizes the most susceptible, and spreads rapidly until they are exhausted: it then subsides, and entirely disappears, either from this circumstance, as in the yellow fever at Gibraltar in 1813; or from a change in the concurrent circumstances and state of the air, as on several occasions in the south of Spain; or from the infectious miasm becoming less malignant in its passage through numerous persons, or from the circumstances influencing the disease in its progress.

31. *g.* That the germs of infection may lie dormant for a time, whilst either the concurrence of manifest causes, or the concealed constitution of the atmosphere, is unfavourable to their development. But as soon as the one or the other, or both become favourable, and predispose the frame, the infection assumes activity, and the distemper spreads accordingly.

32. II. *a.* OF THE PRECURSORS OF EPIDEMICS. — It is obvious that the true and only precursors of epidemics are their *Causes.* The phenomena preceding the more pestilential diseases have been too often magnified or misinterpreted, either from ignorance, or for the purposes of argument. One

of the precursors most insisted on by writers, is intemperature of the seasons; but it has been shown above, that although this may be a principal cause of the prevalence and aggravation of the endemic diseases of a country, it has only a concurrent influence in producing malignant or wide-spreading epidemics — some of the most pestilential not having been thus preceded; and, even where it has been remarked in its most intense forms, it has operated chiefly in favouring the generation of infection, and in predisposing the community to be impressed by the infectious miasm. The circumstance of nearly all epidemics commencing among the poor, and being most destructive to them, is a manifest consequence of their earlier and much greater exposure to, and predisposition to be affected by, the exciting causes — more especially such as are specific and energetic — than persons in good circumstances; and of the concurrence of causes occasioning epidemics, taking place chiefly in the former class, and very rarely in the higher grades of society.

33. *b.* Another precursor, on which much stress has been laid, viz. disease and mortality in the lower animals, is one which has likewise been shown, even when it precedes an epidemic, which is only occasionally the case, to be the necessary consequence of their earlier or greater exposure to its chief causes. In some unhealthy climates I have visited within the tropics, where malignant remittent fever, agues, and dysentery, in various forms, according to the habit, constitution, &c. of those who arrive, or are resident in it, are constantly prevalent, the more perfect animals, as horses, cattle, sheep, dogs, &c., soon die, evidently from the concentrated exhalations almost constantly evolved from a humid soil, and other endemic sources. This circumstance proves that the epidemic which is thus preceded is merely an aggravated form of the endemic of the place, more generally diffused through the community, owing to the concurrence of additional causes, than is commonly observed; and not a new or different distemper, unless either infectious miasms have been evolved by those first affected, and, having become a superadded cause of great activity, have thereby changed the character of the epidemic, or infection has been introduced originally, and favoured in its operation by the terrestrial exhalations, state of the air, &c., which occasioned at first the mortality in the lower animals, and the aggravation of the endemic disease. But in this latter case, the mortality in animals, as insisted upon above, will have been posterior to the commencement of the epidemic; as fully shown in the accounts furnished by the aggravated plague, or "*black death*," which extended over Europe during 1348, 1349, and 1350; and in the progress of pestilential cholera. Both BARNES and WOOD expressly state that the fatal murrain among cattle, that accompanied the black plague in England, in 1349, was several months subsequent to the appearance of this plague; and HECKER remarks,—"Of what nature this murrain may have been, can no more be determined, than whether it originated from communication with the plague patients, or from other causes; but this much is certain, that it did not break out until after the commencement of the black death." (p. 70.)

34. *c.* Some authors have viewed the aggravation of the sporadic and endemic diseases of a country as forerunners of pestilential epidemics, and have considered an occasional occurrence, or a mere coincidence, as an intimately connected phenomenon. Much misapprehension, also, of a different kind, as will appear hereafter, has arisen on the subject. Dr. MEAD and Dr. HEBERDEN have too easily admitted that malignant or putrid fevers often precede plague; and various writers have contended that yellow fever commences as the bilious remittent of the country, — the latter passing into the former by such insensible grades, that a difference between them cannot be assigned. This last assertion, although made by some of the ablest of the non-infectionists, and insisted upon by all of them, is very properly denied by those who consider yellow fever to be distinct from even the worst forms of endemic fever. The diagnosis between them, the establishing of which is of so much importance in the controversy, is given in another place. But that there is a wide difference in the causes, the symptoms, the duration, the mortality, the morbid changes, the contaminating effects, &c. of both, I am morally convinced. One of the most recent ablest, and most moderate writers on this subject, Dr. HANCOCK, believes in the gradual and imperceptible change of malignant fever into plague, and of remittent into yellow fever. But I cannot agree with this opinion. There is, doubtless, much difficulty sometimes in distinguishing a very violent case of bilious remittent, from yellow fever; or a severe one of adynamic continued fever, from a certain form of plague; and the difficulty is greatly increased by the fact, that the infections of yellow fever, and of plague, are propagated chiefly by the concurring aid of those causes and circumstances which respectively give rise to, and favour the prevalence of, bilious remittents and adynamic fevers; and that, without such aid, these infections cannot occasion their respective distempers in a pestilential or epidemic form. Great stress has been laid upon the prevalence of fevers in London, at the time of the appearance of the great plague. But fevers were necessarily more or less prevalent in the then circumstances of the city; and it does not actually appear that they were more so at the time, when the first cases of plague occurred, than on other occasions. The imputed prevalence of a malignant fever, which SYDENHAM mentions (see *Works*, p. 105—107. and 123. *of Leyden edit. of* 1726.), occurred during the spring of 1665, — some months after the first cases of plague — and was considered by him, for reasons which he assigns, especially its difference from all other fevers that he had ever seen, as a variety of that pestilence. How could it, then, be the forerunner? Did the writers who lived subsequently know more of the matter than SYDENHAM and others, who saw the commencement of that plague, as well as its decline; at which latter time, this milder form of the plague — this malignant, spotted, or putrid fever, as it was called for the purposes of deception, as shown hereafter — began to predominate, owing either to the change in the temperature of the air, or some other alteration in the epidemic constitution. But, even admitting that fevers were actually prevalent before, and during the commencement of that pestilence, the association of

causes giving rise to their prevalence was, at that epoch, exactly such as would favour the action and propagation of the infection of plague, provided it had been introduced either by an infected person, or by fomites. That such introduction took place, and that the pestilence spread in consequence of the concurrence of causes productive of fever, is more probable, independently of the strong evidence of the fact, than that the circumstances usually occasioning fevers should have generated a progressively malignant distemper, until plague was at last produced. Our knowledge of pathological phenomena does not warrant this latter inference; for if such progression without any specific difference existed in respect of these maladies, we should surely see, on some occasions, the infection of plague give rise to fever, just as the confluent, often produces the distinct, small-pox; or the malignant, the mild, scarlatina;—or, without reference to cause, we should sometimes observe plague subside into common fever; as we often see malignant remittents lapse into ague.[*] The same reasoning equally applies to the supposed passage of remittents into true yellow fever — an error which is fully exposed at other places (see § 43., and Fever, Yellow).

35. *d.* Several writers have insisted upon the appearance of malignant fevers, during and after the decline of plague, as a proof of the convertibility of the one disease into the other; and have referred to Sydenham's account of the plague of 1665, in support of their argument. But he distinctly infers that the malignant, or spotted fever, as it was named in the bills of mortality, was a variety of that pestilence, which continued during 1666, chiefly in that form, when it ceased to be epidemic. It is not improbable, however, that though many of the cases of the malignant fever seen after the decline of the plague, were milder cases of this distemper; yet some may have been — especially at a later period — actually cases of adynamic fever, occasioned by the contamination of the air, by the exhalations arising from so many thousand bodies scarcely covered by earth in the crowded churchyards of the city, and pits in which they were thrown, within the short period of a few weeks, and during a warm season; fever and dysentery affecting, owing to this very obvious cause, many of those whom the infection of plague had spared, or who returned to London after the epidemic had ceased. The circumstance, also, so much relied upon by Schenk, Horst, Short, Hancock, and others, of continued fevers, dysenteries, small-pox, and measles, when raging epidemically, being frequently forerunners of plague, and sometimes reappearing upon, or following, its decline, is certainly no proof of the convertibility of either of these maladies into pestilence; but merely shows that, during epidemic constitutions, in which other diseases usually propagated by infection had become very prevalent, plague likewise spread rapidly owing to its infectious property — its contingent appearance after these maladies commenced, having depended upon the introduction of the pestilential infection, which was but little guarded against at the time when Schenk and Horst wrote, and not at all in the Mahomedan countries where this occurrence has been noticed by Jackson and others.[*]

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[*] Upon a careful examination of Sydenham, Baynard, Hodges, De Foe, &c., it is manifest that the malignant spotted fever, said to have prevalent at the commencement and decline of the plague, was actually this distemper, reported as fever for the purposes of concealing its existence; and that, where this fever actually existed, it was one of the forms that plague very commonly assumes, especially during low ranges of temperature, as at that season. De Foe (whom I consider especially deserving notice as to this point, as he had no medical doctrine to support) states, after describing the introduction and commencement of plague in St. Giles's, in December, 1664, that, early in May, 1665, "it had gotten into several streets, and several families lay all sick together; and, accordingly, in the next weekly bill, the thing began to show itself: there was, indeed, but fourteen set down of the plague, but this was all knavery and collusion; for St. Giles's parish buried forty in all — most of whom, it was certain, died of the plague." In the next week's bill, but nine were set down to the plague; "but, on examination more strictly by the justices of the peace, it was found there were twenty more, who were really dead of the plague in that parish; but had been set down of the spotted fever, or other distempers, besides others concealed."—"Now the weather set in hot; and, from the first week in June, the infection spread in a dreadful manner; and the bills rose high, and the articles fever, spotted fever, &c. began to swell: for all that could conceal their distempers did it, to prevent authority shutting up their houses," &c. (*Hist. of Great Plague*, p. 6. and 7.) A reference to the bills of mortality will show, that, at the time the plague first appeared in London, there was no particular prevalence of disease. The attempts thus made to conceal the existence of plague have been equalled in the present day, during the prevalence of a different malady; and in more places than London. The reputed predominance of putrid and spotted fevers, therefore, believed in by Mead and Heberden, who wrote long afterwards, was altogether a mistake; which originated as I have now shown, and was actually subsequent to the appearance of the first cases of undoubted plague.

[*] The non-infectionists insist upon *four things;* the truth of which they take for granted, and make the bases of their arguments in proof of their doctrine. The *first* is, the passage of fever into plague, and of remittents into yellow fever. I have shown, particularly, in other articles, that no such transition takes place; and that it did not take place in the great plague, to which especial reference has incorrectly been made in proof of it. That pestilential infection spreads most readily in circumstances productive of continued and remittent fevers, is fully admitted; but the difficulty of distinguishing between these fevers and the pestilential epidemics is not so great as the non-infectionists are desirous of showing as an argument in favour of the opinion that the latter are only higher grades of the former, and devoid of specific differences.

The *second* is, that prevailing diseases are banished while epidemic pestilence rages. This only occasionally and partially obtains; and, when observed, is owing chiefly to the circumstance of a great part of those persons, who, from exposure and predisposition, would probably have been affected by the usual endemic diseases of the place, being actually such as are most obnoxious to the attack of pestilence. Pestilential cholera did not banish other diseases during its prevalence; or, at most, did so very partially: and similar facts have been remarked in respect of other pestilences — both plague and yellow fever. The great plague furnishes no grounds for the statement, that I can find in the writers on it the most deserving of confidence, more particularly as there actually appeared to be no prevailing disease at the time when the first cases of plague occurred. Facts should be duly investigated, before they are made the bases of important inferences. How many "false facts," furnished by the ignorant, the prejudiced, and the emissaries of interested traders and chartered companies, have been adduced in support of this and other parts of the doctrine, are best known to those who have devoted long and patient study to the subject.

The *third* statement is, the reappearance, upon the decline of pestilence, of the prevailing diseases which preceded it, — a circumstance of only occasional or even rare occurrence: 1st, because pestilences are only occasionally so preceded: and, 2dly, when they are so preceded, these diseases do not always disappear; nor, when they disappear, do they always return. I appeal to facts. Let them be scrutinised; and, when diseases which prevailed at the breaking out of pestilence, return after it has ceased, the occurrence is to be explained either as hinted at above, or by referring to the influence of existing endemic sources, and the causes usually concurring

36. *e*. The appearance of swarms of insects has been likewise considered as a forerunner of epidemics. After mild and open winters, when the cold has not been sufficient to destroy the eggs and larvæ of insects; and during moist and warm springs and summers, when warmth, moisture, and animal decay have contributed to their extraordinary generation; various species of both insects and reptiles have sometimes become so numerous, especially in low and humid districts, as to destroy the vegetable productions, to occasion scarcity, and, by the decay of their exuviæ and dead bodies, to increase the local sources of diseases. They have thus contributed to the causation of an epidemic constitution, and, perhaps, in some instances, have directly produced disease. In such cases, they have either preceded or attended the commencement of the epidemic. The common insects of a country have been said to have disappeared during the prevalence of pestilence. If this have occurred, it may be referred to the operation of the same cause to which the disappearance of, or death of, birds was imputed (§ 13.). But the non-infectionists, who have endeavoured to torture an argument in favour of their views out of the latter circumstance, have not ventured to affirm, as they did in respect of the disappearance of birds, that an unusual absence of insects or reptiles has been ever remarked as a forerunner of pestilence.

37. *f*. As to the influence of comets, meteors, earthquakes, the breaking out of volcanoes, &c. in causing epidemics, or even in indicating their approach, there is not the least evidence, notwithstanding NOAH WEBSTER's labours to demonstrate it. Coincidence may have been sometimes remarked: but it would require a tolerably uniform antecedence of the former in respect of the latter, to show any relation between them, either as cause and effect, or as concurrent results of one general or pervading cause.

38. III. NOTICES OF SOME EPIDEMIC CONSTITUTIONS OF AUTHORS. — In *illustration* of what has been already advanced, I will take a brief view of some epidemics, and the causes to which they have been chiefly imputed by those who have recorded them. Epidemics and pestilences of recent occurrence, as well as some of very early date, are referred to in other and more appropriate places. RAMAZZINI records, that the years from 1689 to 1694 were wet, the winters mild, and inundations frequent; and that periodic fevers of an unfavourable kind, and diseases of the bowels, were epidemic; which he attributes chiefly to the irregularity of the seasons, and to the failure of the crops. But these were manifestly only a part of the elements which contributed to the causation of these maladies; the warmth of the climate, the great quantity of rain, and the frequent inundations, with their more direct results, being equally, if not much more, powerful agents. BAGLIVI describes the epidemic constitution of 1703 to 1705, and imputes it chiefly to the seasons, which were mild and rainy in winter and spring, and dry in summer and autumn. Earthquakes were frequently felt during these three years, in the States of the Church; and caused great alarm in the minds of the inhabitants, contributing thereby to the prevalence of disease. He states, that apoplexies and sudden deaths were very frequent; and that they had been also prevalent during 1694 and 1695, throughout Italy. Although he attibutes them chiefly to irregularity of the seasons, it is more than probable that the wars, and the attendant evils, which devastated that country during these years, were equally concerned in their production. COTUGNO and SARCONE have described an epidemic, which was very fatal in Naples in 1764, which followed irregularity of seasons, and a scarcity of grain; and which appeared

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with them or increasing their activity. Those "prevailing or minor epidemic diseases," which these writers (see Dr. HANCOCK, in *Cycl. of Pract. Med.* vol. ii. p. 82.) have viewed, not merely as the forerunners of pestilence, but as convertible into it, must be either epidemic or endemic, otherwise they cannot be said to prevail. If the former, which the writer just referred to admits, where are the facts? — Can they bear scrutiny? None have been adduced that can stand the test. If the latter, the circumstance might be expected, *à priori*, occasionally to occur, and is no proof either of the convertibility of the endemic into an epidemic pestilence, or of the absence of infection. The distemper to which this statement is most applicable, and regarding which it has been especially made, is yellow fever, as it requires a certain concurrence of causes for its development, especially in temperate climates which are chiefly and commonly productive of endemic fevers. Those causes are also the principal predisposing and concurrent agents in the diffusion of the infection of yellow fever, which thereby attacks a large proportion of those who might otherwise have been seized by the endemic maladies — the predisposition to infection, occasioned by those causes, favouring an attack of the pestilential epidemic, which thereby takes the place of the endemic disease. Can it be a matter of surprise, or should it not rather be expected — (*a*) upon the breaking out of epidemic yellow fever, which requires a high range of atmospheric warmth for its existence, and which, therefore, can occur beyond the tropics only at particular seasons, which are also those of remittents, that these latter or other endemic diseases should prevail? — (*b*) or, after great numbers have left the place where it has appeared, and the population is thereby greatly reduced; and when three fourths, or even more, of those who remained are attacked by it, as in the epidemics in the south of Spain; that the endemic diseases that prevailed, and which generally do prevail, at these seasons, should then not be heard of, or entirely disappear? — (*c*) or that, when the inhabitants who had departed have returned, and seeing that an attack of one disease does not necessarily preclude an attack of a different disease, remittents and other endemic disorders should reappear to a greater or less extent, according to the intensity and combination of causes producing them, after the pestilential epidemic has ceased? A careful investigation shows that the phenomena connected with this and other pestilences are actually such as may be inferred *à priori*, conformably with the doctrine which imputes them, viz. plague, yellow fever, and pestilential cholera — the chief pestilential epidemics with which we are acquainted — to infection.

The *fourth* and last statement of the non-infectionists, to which I shall here allude, is, that "no pestilential epidemic is one form of disease" (*Op. cit.* p. 82.), or of unvarying type; and they adduce this as an argument of such epidemic being an aggravated form of the diseases endemic to the place in which it breaks out. But what is the foundation for this statement? Actually none: for, however much the pestilences just enumerated may vary in grade and severity, they present, individually, such speciality of features, wherever they are observed, as readily enables the well-educated, the careful, or the candid observer, to distinguish them from diseases which approach them the nearest in character; and are as unvarying as small-pox, measles, or scarlet fever—if, indeed, they be not much more so. We see these latter maladies vary in severity, but they still preserve the same specific features; so do the pestilences in question. We, moreover, see the infections of those familiar and domestic diseases very limited, or scarcely at all diffusing themselves, at certain times and seasons; and, at others, spreading rapidly, generally, and in severe forms; — the same is also observed in respect of plague, yellow fever, and pestilential cholera. The principal difference between the epidemic manifestations of these two classes of distempers is in the frequency and the seasons of their appearance; and this is owing to the nature of the causes concurring to aid the diffusion of their respective infections; and without which aid they could not prevail generally, or become epidemic.

first among the poor, presenting the various malignant forms of continued and remittent fever. Bleeding, emetics, purgatives, bark, opium, &c. were principally resorted to, but the mortality amounted to nearly one half of those affected. The intermittent, and subsequently the remittent, character which the epidemic assumed during its early progress, proved that the state of the seasons, and the abundant sources of malaria, which existed at the time, were concerned in its production: but the great malignity, with tendency to dissolution, in the fluids and soft solids, which characterised its advanced progress, evinced the operation of additional agents; and these were sufficiently apparent in the wretchedness of the lower classes, the bad quality of the grain, in the want of cleanliness and the general inattention to infection, excepting in the religious houses, which escaped.

39. M. Fodéré refers to the transactions of the physicians of Berlin, Augsbourg, Breslaü, Presbourg, and Laybach, to show that the seasons were not the chief causes of the epidemic constitutions they describe. Indeed, at numerous periods, as well as at these, the seasons have been remarkably irregular, without disease becoming epidemic, unless where *endemic* sources have been very much increased by such irregularity, or where the evils of war, or scarcity, or some other element of an epidemic constitution, have been superadded. When diseases have prevailed, they have not always been influenced by the state of the weather and seasons alone, more especially when they have possessed infectious properties. Sydenham, although he once conceived that the epidemics of this climate could be accounted for by means of the sensible states of the air, subsequently confessed that they depended less upon these states than upon something in this fluid that could not be ascertained; a more extensive observation having proved the inaccuracy of his former opinion, and confirmed the inference at which Hippocrates had arrived. Geoffroy and others attribute the adynamic and infectious fevers, dysentery, and scurvy, which became epidemic in Paris and the surrounding districts in 1709, to the very severe winter and spring of that year. But a stricter examination has shown that much more was owing to the scarcity of provisions, to their increased price, from the imposts of a disastrous war, to the oppression and poverty of the lower classes, to the want of cleanliness, and more particularly to infection favoured by these circumstances, by the state of society and manners, and by inattention to ventilation, &c., than to the severity of the seasons, to which they had been imputed; this co-operation of the elements of an epidemic constitution protracting as well as extending the prevalence of these maladies, as might have been expected, *à priori*, during three years, and for some time after certain of these elements had begun to disappear. In proof of the accuracy of this view of the matter, I may add, that the early months of 1716 were equally severe in Paris, and yet no epidemic occurred; for the principal causes which came into operation in 1709 did not then exist. In 1726, the winter and spring, in the same part of France, were very cold and wet, and grain somewhat scarce; but there was little increase of disease, — scurvy being, as it always was during the preceding century and the early part of the last, one of the most common maladies of that country. But in 1740, a similar severity of these seasons existed, and was aided by the evils of war, by a much greater scarcity, amounting to famine in many places, and by infection, with the rest of the causes just enumerated; and the results were such as the well-informed pathologist might have inferred from this combination of agents, more especially when acting upon a population physically and morally constituted and circumstanced as the French of that period were: these results being infectious, adynamic, and malignant fevers; dysentery, diarrhœa, and scurvy. Cold and wet seasons, thick fogs, and winds that have passed over marshy and woody countries, are often productive of epidemic catarrh, hooping cough, sore throat, bronchitis, rheumatism, &c., especially among children, aged persons, and females; and, as additional agents come into operation — as scarcity, emanations from animal bodies, infection, or whatever depresses the powers of life — so the character of the epidemic changes, and the maladies above enumerated, or the exanthemata, supervene, and spread widely.

40. The malignant remittent fevers that raged in the summer and autumn of 1652, in Copenhagen (Bartholin); of 1657, in London (Willis); of 1669, in Leyden (Sylvius de la Boë); of 1691, in various parts of Holland (Dekkers); of 1684, in Helmstadt (Schelhammer); of 1695, in Rome (Lancisi); and of 1737, in Breslau (Hann); and which presented somewhat modified characters, with the variation in the circumstances producing them, were very generally imputed to the epidemic constitution of these seasons, by the authors just named. But the evidence they have themselves furnished of the state of the antecedent seasons, and of the great heat and protracted drought following inundations, and exposing places generally covered by water, together with various concurrent and subordinate circumstances, satisfactorily accounts for these epidemics. These cities were, for a time, owing to these causes, similarly circumstanced to places within the tropics surrounded by the sources of endemic diseases; and consequently the prevailing maladies were, in their most prominent features, the same as those which are common to such places, or which attack unseasoned Europeans visiting them. This was manifestly the case, on these occasions, as regards Copenhagen, Leyden and other parts of Holland, and Rome. London, in the middle of the seventeenth century, was still surrounded by marshes and low grounds on nearly three of its sides. These endemic sources, during very hot summers and autumns, particularly when these followed immediately upon wet seasons or inundations, always occasioned periodical and continued fevers, dysentery, &c.; and, aided by a crowded population, want of cleanliness and ventilation, the manners of the lower classes, by moist and calm states of the air, and possibly by certain electrical conditions, favoured not only the generation of the more common infectious fevers, but also the development and propagation of foreign infection, as that of plague, when introduced.

41. The fever characterised by disorganisation of the digestive mucous surface, — the *Mucous Fever*, of Fodéré and others; the *Febris Stoma-*

chali-epidemica, of ARNOLD; the *Adeno-meningeal Fever*, of PINEL; and the *Gastric*, the *Catarrhal*, the *Mesenteric*, &c., of various authors, — had been observed in an epidemic form, on various occasions, somewhat similar to that in which it occurred in Gottingen in 1760 and 1761, when it was accurately observed and described by ROEDERER and WAGLER. It then assumed a very severe form, modified into the remittent, dysenteric, nervous, adynamic, and infectious states by the circumstances which concurred in producing it. These years, as well as those immediately preceding them, were very wet, and, moreover, the epoch of scarcity and war, during which the city was besieged. Hence it cannot be a matter of surprise that agues, remittents, dysentery, scurvy; gastric, adynamic, and typhoid fevers, &c., should have successively appeared; or that either should have successively predominated; or that a fever of a mixed or complicated character, and very severe form, should have prevailed during the co-operation of these energetic elements or agents of an epidemic constitution. My limits will not permit me to take a further view of the epidemic constitutions of authors. Those described more recently by HUXHAM, HEBERDEN, SIMS, &c. are of easy access to most physicians, and furnish merely illustrations of what has been already advanced. The epidemics which have occurred during the last half century in America and the south of Spain are particularly reviewed in the article on YELLOW FEVER. I shall, therefore, only advert to certain topics connected with them, and state such inferences as observation and study suggest.

42. Many of the writers who have either seen or given an account of the epidemic occurrences of yellow fever, as DEVÈZE, JACKSON, FERGUSON, &c. have insisted particularly upon the agency of miasms extricated, by a powerful sun, from the soil, and of the electrical states of the atmosphere, in their causation. It is very probable that such miasms emanate from rich deep soils abounding with the elements of vegetable and animal organisation and life, during very hot seasons, and when they are fully exposed to the sun's rays; it is also probable that vicissitudes in the electrical conditions both of the air and of the bodies placed on the earth's surface occasionally take place; and it is possible that both these agencies may be occasionally coincident, or co-operate in certain localities. But we possess no evidence, even granting their existence, that they are capable of producing the effects ascribed to them. Their existence, however, is only a matter of inference from certain phenomena which cannot sometimes be otherwise satisfactorily explained, and not of demonstration; and although the proofs of the injurious operation of the former of these are more convincing than those yet furnished in respect of the latter, yet facts are still wanting to render the evidence in support of it complete. After a personal examination of many of the localities, both within and without the tropics, to which certain pestilential epidemics have been altogether ascribed by many writers, I cannot come to the conclusion that, under circumstances of the kind just stated, these localities could ever, of themselves, produce the very general and fatal effects characterising these pestilences; that even the warmest sun, the stillest atmosphere, and the longest absence of thunderstorms, which observation has ever shown to have occurred, — the conditions so strongly insisted upon by these writers, — could generate from them miasms of so noxious a nature as to occasion, by their unaided action, such pestilential epidemics as have occurred in various parts of America, and the south of Spain. That endemic sources of disease, especially the situations alluded to, give out miasms when long acted on by a hot sun; that these often become concentrated in a humid and calm atmosphere, or after autumnal showers; and occasionally are aided in their operation upon the human frame by the electrical states of the air; may be admitted; for an increased prevalence, and a more severe form, of fever is often observed in these situations, on such occasions. But after the most careful consideration long bestowed on the subject, and after a patient enquiry into the facts recorded, I cannot believe that these exhalations are the only, or always the chief, cause of these epidemics. That infection is a primary agent in the propagation of the disease, and that an infectious miasm is generated by the sick, cannot, I think, be denied by the candid enquirer into *all* the facts connected with the subject. But I believe that, without the physical changes and the consequent emanations alluded to, or some other concurring causes, the infection would not extend through the community, as these emanations, floating in the air, dispose the system to be impressed by the infectious principle, or otherwise aid its operation; or, in circumstances where the terrestrial exhalations have already produced much disease, the miasms from the sick become a superadded cause, increasing the severity of the epidemic, as well as the rapidity and universality of its spread. That an infectious principle is concerned thus primarily or consecutively in the production and propagation of pestilential epidemics, according as it may be introduced from some other quarter, or generated by those first affected, appears fully established by numerous circumstances, independently of various considerations derived from the nature of the particular epidemic, and of the antecedent and consecutive disorders, especially those endemic to the place in which it breaks out. Of these considerations, the following seem not the least important.

43. *a*. The localities to which certain epidemics, as yellow fever, are chiefly confined, have been, for many successive years, circumstanced, in respect of season and weather, similarly to the periods in which that disease has been most destructive; and yet the common endemic of the country only has been observed, in the form it usually puts on in that particular season.—*b*. True, or epidemic yellow fever differs not merely in degree, but also most essentially and in kind, from the endemic fever of these localities; consequently the former is not merely an aggravated state of the latter,—the one disease is as different from the other, as small-pox is from measles. — *c*. On all occasions on which the non-infectious properties of yellow fever have been argued for, the bilious remittent or severer forms of endemic fever of low situations in warm countries, and the ardent or seasoning fever of Europeans who have lately arrived within the tropics, have been assumed as identical with that malady. This error

has arisen from the occasionally yellow appearance of the skin in the bilious remittent, and the dark or coffee-ground vomiting sometimes seen before death in it and in the ardent fever. But these changes are not the same, even in the cases where they are most prominent, as those in the true yellow fever; and, as shown in another place, are owing to very different pathological states. — *d.* That the very essential difference between these diseases indicates their different origins; and a speciality of form in the various quarters where the epidemic malady has been observed, equally denotes its source in a specific cause. — *e.* That diseases which arise from terrestrial exhalations present numerous modifications, forms, and types; have all a tendency to relapse, or to return in some form or other, upon exposure to the exciting cause; and always occasion marked derangement, and ultimately organic change, of the liver, spleen, or pancreas, or one, or all: whereas the true or epidemic yellow fever, independently of the most irrefragable proofs of infection, possesses all the attributes of infectious diseases; attacks the frame only once, as shown by the most unquestionable evidence, British and foreign, derived from the epidemics of Spain and America; and leaves no organic changes of these viscera as sequelæ, even of its most malignant state. — The manner in which the very different diseases now referred to have been confounded the one with the other, by those espousing the non-infectious nature of yellow fever, whether from ignorance or unfairness, has led to the most serious consequences to the community; has misled the inexperienced, mystified the subjects in dispute, furnished grounds for a special pleading sort of argumentation, and, as will be seen in the articles FEVER and INFECTION, endangered the safety of fleets and armies, and even of kingdoms.

44. IV. GENERAL INFERENCES.—*a. Civilisation* exerts a most decided influence in diminishing the frequency and mortality of epidemics, especially those that are fatal or pestilential, as shown by their history at different epochs, and in different countries holding various grades in the scale of civilisation,—an amelioration evidently due — *α.* to a better cultivation of the soil; to more extensive commerce, and, consequently, to the less frequent occurrence of great scarcity, and to the improved diet and circumstances of the lower classes, in most European countries, in modern times; — *β.* to a favourable change in the manners and habits of the middle and lower classes, particularly in regard to cleanliness, social intercourse, and domestic arrangements; and to better ventilated and improved dwellings; — *γ.* to superior care in the separation and treatment of the affected; and to stricter measures for the prevention and counteraction of infection. Owing chiefly to neglect of these circumstances, the lowest classes, and the most wretched amongst these classes, are most frequently attacked — the mortality being also the greatest among them in proportion to the number affected.

45. *b. Different ages* are not equally affected by epidemics. The exanthematous fevers and hooping cough are most prevalent among, and fatal to, infants and children; influenza, to the aged and debilitated. Continued fevers, in adynamic and malignant forms, attack chiefly persons from fifteen to sixty; but are less fatal to them, than to those of earlier or later ages. Plague most frequently seizes adult persons of early or middle life, and generally males in somewhat greater numbers than females, — probably owing, in part, to more exposure, at this age and of the male sex, to the predisposing causes and to infection. Yellow fever attacks chiefly the young and middle-aged; but spares only those who have passed through it in former epidemics. Pestilential cholera, on the other hand, does not so often attack persons about puberty and the meridian of life, as those that are aged and exhausted; and it is usually more fatal in the latter than the former. When increased activity of endemic causes produces epidemic fevers, young children often suffer very remarkably; and the malady assumes, in them, gastric, choleric, or dysenteric forms.

46. *c. The mortality from diseases,* when they first appear in an epidemic form, is usually very great; but diminishes with the frequency of their recurrence, especially those which have sprung up since the early history of our science, and which are of a contagious or infectious nature. This has been the case with hooping cough, measles, syphilis, small-pox, and may probably be so with pestilential cholera. It is not so manifest with regard to pestilences appearing after long intervals: but these are usually much more fatal at their commencement, or during their early course, and less so at their decline. The first introduction of small-pox, syphilis, &c. among savage tribes, has been as destructive as the pestilences that occurred in the middle ages. This can be explained only as briefly stated above (§ 30.).

47. *d. As to the influence of epidemics on population,* it may be inferred, that the diminished prevalence of certain maladies, which formerly raged epidemically, is in some respects compensated by the greater frequency of other diseases, formerly of rarer occurrence; or the appearance of some previously but little or not at all known. — *α.* Since the introduction of vaccination, small-pox has rarely prevailed to a great or fatal extent; but scarlatina, measles, croup, inflammations of the bronchi and lungs, and cerebral affections, have evidently increased. The benefits, therefore, of vaccination may be said to be somewhat over-rated. It is remarked by M. SAY (*Cours complet d'Economie Politique,* t. iv. p. 385.), "When we hear it said, that, by saving a hundred thousand lives, vaccination has added a hundred thousand souls to the population, we may smile at the error, whilst we applaud the discovery." M. VILLERMÉ has deduced from his researches, that, in populous countries, and particularly in large towns and cities, and in the lower classes, small-pox is fully replaced by an increase of other dangerous diseases; but in districts furnishing sufficient subsistence and scope for increased population, and in the higher classes, this compensation is hardly or but slightly observed. Indeed, all preservative measures against the diseases of infancy act similarly, — in suppressing one cause of death, we more or less increase the activity of the rest.

48. *β.* In civilised countries, epidemics, although attended by a very great mortality, only

temporarily diminish the population; for it is uniformly observed, that the void is filled up, during the next few years, by a much greater annual average of marriages and births, and by an influx of strangers from other parts, the mortality leaving more abundant means of subsistence for those who have escaped. Destructive epidemics are most frequent in low situations and crowded cities; and epidemics of a slighter kind and commoner form often occur in these and other districts abounding with malaria; and, whether they be aggravated forms of the usual endemics, or infectious fevers, &c., they all indirectly tend to augment the number of marriages and births, whilst they increase the deaths and diminish the mean duration of life. These results are evidently owing to the more abundant means of sustenance and employment furnished by these places, than by mountainous and barren districts; and to the influx from more healthy parts; the excess of deaths over births being supplied from the latter source. The following statistic return, furnished by M. Bossi, prefect of the department of the *Ain*, in France, and which he has divided into four zones, according to the nature of the locality, illustrates this statement, and shows —

	1 Death annually to Inhab.	1 Marr. annually to Inhab.	1 Birth annually to Inhab.
In the hilly districts - -	38·3	179	34·8
Along banks of rivers, &c. -	26·6	145	28·8
In cultivated grounds -	24·6	133	27·5
In marshy places, &c. -	20·8	107	26·1

(For the *Prevention* of Epidemics, see *art.* Endemic Influence (§ 20.) and Infection.)

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EPIGASTRIUM. Syn. — Ἐπιγάστριον (from ἐπὶ, upon, and γαστὴρ, the stomach). *Regio Epigastrica. L'Epigastre.* Fr. *Der Oberbauch, Ober-Schmeerbauch,* Germ. *Epigastrio,* Ital. *Pit of the Stomach.*

Classif. — General Pathology, &c. *Semeiology, &c.* Special Pathology.

1. I. Examination of its States. — A careful investigation of this region, and accurate interpretation of the phenomena it may present, are of the utmost importance in practice. The symptoms of disorder referrible to this part, must not, however, be estimated by themselves, but in conjunction with others furnished by the adjoining regions, by the general surface, by the pulse, by the state of the tongue, by the excretions, &c. — Attention was directed to this part in the diagnosis and prognosis of disease, from the earliest history of medicine. Hippocrates remarks, that it is a favourable symptom in fevers, when the epigastrium is supple, soft, equal, and free from pain.

2. i. *Altered or augmented sensibility* of this region, in any degree or kind, is an important indication of the seat, the nature, and the result of disease. In order to ascertain these points more accurately than can possibly be otherwise done, not only should the patient's account of his sensations be attended to, but the bared region should be carefully examined, when it can be done with propriety (§ 3, 4.). The *sensibility* of this region is greater than that of any other, more especially in thin delicate persons, and females — in the hysterical and hypochondriacal. It is increased in many acute diseases — frequently in fevers, of every type and form, very remarkably in gastritis, generally in hepatitis and diaphragmitis, particularly on pressure, and in inflammatory dyspepsia. Morbid sensibility amounts to acute pain, characterised by anxiety and a sense of vital depression or sinking in inflammations of the stomach, of the tendinous part and peritoneal surface of the diaphragm of the upper portions of the peritoneum and omentum, and of the gall-bladder and ducts; and in spasm of, or impaction of gall-stones in, the latter. In all these, tenderness is often extreme, and pressure is followed by sickness and desire to vomit. Pain is commonly dull, heavy, gnawing, or but little felt except on pressure, and deep-seated, in chronic inflammation of the liver, particularly of its substance; in hepatic abscess; in chronic disease of the gall-bladder and ducts, of the pancreas, and of the orifices of the stomach. It is burning and attended by nidorous, acrid, and acid eructations, in cardialgia and other dyspeptic affections, particularly in the gouty diathesis, or before a paroxysm of this complaint; or upon its retrocession, on which occasion this sensation is aggravated, and is attended by great anxiety and vital depression. A sense of heat or burning at this part often precedes an attack of hæmatemesis; and the same feeling, with acute, lacerating pain, anxiety, depression, remarkable tenderness, tension, and continued or repeated vomiting, characterise acute sthenic gastritis. When a fixed, deep-seated, occasionally lancinating, pain is felt at the upper part of this region, sometimes extending under the sternum, or between the left shoulders, or under the shoulder-blade, and is increased during or directly after eating, or is accompanied by difficult deglutition, or rumination, or by palpitations and irregular action of the heart, then organic lesions of the cardiac orifice of the stomach may be inferred. Similarly characterised pain at the lower part of this region and to the right, increased an hour or two after a meal, and sometimes attended by sickness, indicates the commencement of chronic disease of the pylorus; but in its advanced stages, these symptoms are felt much lower down in the abdomen, or to the right of this part. — Pain of this region is a symptom also of acute and chronic pericarditis, particularly at the upper and left portion of it; and is frequently complained of, especially after a meal, by females who wear tightly laced corsets, and during the latter periods of pregnancy. A sensation of gnawing, erosion, &c. frequently accompanies worms in the prima via, and, in some cases, the first months of utero-gestation.

3. ii. *Distension, tumefaction,* or *distinct tumour* of the epigastrium is seen in various diseases. Unusual *fulness,* or *elastic distension,* is generally occasioned by flatulence of the stomach, or by collections of air in the colon. In these cases, external pressure, if it be not prevented by increased sensibility, which is usually also present, often partially expels the flatus; and a tympanitic sound is emitted on percussion. Borborygmi are also troublesome, particularly when this symptom is observed in hysterical and hypochondriacal cases, or in flatulent colic. It also attends upon accumulations of bile in the biliary ducts and gall-bladder, and upon congestion of the liver; but in such cases, the fulness is partly owing to the disease of these parts, and partly to a contingent distension of the stomach by air. — *Tumefaction* of this region is frequently seen in hydrothorax, and in chronic pericarditis, with effusion into the pericardium; but most remarkably when the patient sits up. In the recumbent posture it is less evident. — Either swelling, or *distinct tumour,* is sometimes observed in enlargement of the liver, particularly of its left lobe, and in abscess of this organ. When the abscess points upon the diaphragm, and rises into the right thorax, swelling is occasionally not observed, but the patient generally complains of a dull or heavy pain, or soreness, with tenderness on pressure, in this part. In two cases of hepatic abscesses, in which I was very recently consulted by the practitioners attending them, there was very great, but diffused, swelling in the epigastrium, with pain and tenderness, in one; and no swelling, but deep-seated pain and soreness, in the other. The nature of the disease was recognised in both instances, and confirmed shortly afterwards by the sudden and profuse expectoration of the contents of the abscesses, which in both cases had opened into the lungs. The patients are still under treatment;

and, in one at least, there are hopes of recovery. Tumour in this region may be occasioned by great distension of the gall-bladder with bile, from obstruction of the common duct; but, in this case, it is more circumscribed and distinct than in abscess of the liver, is unattended by any appearance of inflammation of the external parietes, is often pyriform, and situated at the lower part of the region, and to the right, fluctuates obscurely, and often disappears after appropriate purgatives. Swelling of this part, in lean persons, may also be occasioned by enlarged or scirrhous pancreas, more rarely by distension of the duodenum, and not so often as is supposed by tumours about the pylorus, because, when they are sufficiently large to distend this region, they generally draw this extremity of the stomach below, and to the right of it. Fulness of the epigastrium is seldom occasioned by distension of the colon with flatus, or accumulated fæces, or by enlarged spleen, or by the effusion of fluid, until after the swelling has appeared to a very considerable extent in the adjoining regions; and then it is greatest at the lower part.

4. iii. *Pulsation in the Epigastrium* arises from the following causes: — *a.* Nervous susceptibility and irritation; — *b.* Inflammation of the aorta; — *c.* Aneurism of the aorta, cœliac, or superior mesenteric artery; — *d.* Adhesion of the pericardium to the heart; — *e.* Tumours at the root of the mesentery; — *f.* Tumours of the stomach, and scirrhus of the pylorus; — *g.* Enlargement of the pancreas; — *h.* Hypertrophy of the heart, particularly of its right side; — *i.* Enlargement of the vena cava inferior; — *k.* Hepatisation of the lower portion of the lungs; — *l.* Enlargement of, or abscess in, the liver. On the chief of these I shall offer a few remarks.

5. *a. Nervous pulsation* of the aorta and cœliac arteries is not infrequent. It comes on suddenly; and often continues long, chiefly in hysterical females, and hypochondriacal men, whose nervous system and digestive organs have been long debilitated or otherwise disordered. It is generally stronger in the morning than in the evening. Dr. BAILLIE met with a case that remained for many years. Dr. VALENTINE MOTT states that of a lady, in whom it occurred as a certain sign of pregnancy; but usually left her after the third month. I have seen it so violent that the pulsation could be observed through the dress, and the patient insisted it could be heard at some distance. (See AORTA, § 2. *et seq.*)

6. *b. Aneurisms* of the aorta and large arteries may occasion pulsation in this region; but they frequently have proved fatal without this symptom being noticed; and, where it has been remarked, the pulsation has not been strong. Mr. A. BURNS states, that aneurism of the cœliac artery is rarely a cause of this pulsation; and that, in about twenty cases of pulsating tumours in the region of this artery, not one of them turned out, upon dissection, to be disease of this or any other artery. (See AORTA, § 44.)

7. *c. Adhesion* of the pericardium to the heart, is sometimes a cause of pulsation; and that it should be, is obvious. Dr. MOTT thinks it one of the most frequent causes. Dr. HOPE describes the pulsation as peculiar, and distinguishes it by the epithets jogging or trembling; it is synchronous with the sounds of the heart. (See PERICARDIUM.)

8. *d. Tumours*, from enlargement of the glands at the root, or in the duplicatures, of the mesentery, are productive of pulsation when they become considerable and press upon the aorta, or cœliac or superior mesenteric artery. A case of this description is described by Dr. ALBERS. In a person whom I attended some time ago, and who had become very emaciated, a distinct pulsation in the umbilical region arose from this cause. Indeed, the pulsation, when thus produced, is rarely so high up as the epigastrium, and is sometimes felt in both regions.

9. *e. Tumours* developed in the *stomach*, or attached to its villous coat, and scirrhus of the pylorus, have been noticed, by BAILLIE, BURNS, MONRO, FRANCIS, and V. MOTT, as occasionally attended by pulsation. I cannot, however, agree with the last writer, in thinking that "the obstruction to the free passage of blood through the hardened" and enlarged parts occasions this symptom; but believe that, when they press upon, or come in contact with, the large arteries, especially the aorta, the pulsation is necessarily propagated to the external situation in which it is felt.

10. *f. Enlargement of the pancreas*, or of the *liver*, is probably more frequently a cause of epigastric pulsation, than tumours connected with the stomach; the enlarged and indurated viscus transmitting the pulsation of the aorta, as just stated. This cause has been noticed by BURNS, WARREN, V. MOTT, PORTAL, and myself. Dr. SEWELL considers that an enlarged pancreas is always accompanied with pulsation at the epigastrium. I think that such is not the case; and that, generally, the disease must be far advanced before this symptom attends it.

11. *g.* Of the other causes of pulsation at the epigastrium, I need only remark, that cases, in which it has been occasioned by enlargement of the *vena cava*, are mentioned by SENAC and A. BURNS. Dr. PEMBERTON thinks that the fluttering, sometimes felt at this region, is produced by congestion of the vena portarum, and the undulation communicated to it. Pulsation from *hepatisation* of the lower margin of the lungs, has been observed by A. BURNS and others. BERTIN, BOUILLAUD, and myself have noticed this as a symptom of inflammation of the aorta. (See art. AORTA — *Inflam. of.*) Its connection with *hypertrophy* of the heart, particularly of its right side, requires no remark.

12. iv. *In examining the epigastric region*, pressure should at first be very gentle, gradually increased, and be made in various directions. When the heart is diseased, it should be directed under the anterior cartilages of the upper false ribs; and, according to the situation of other organs or parts suspected of disorder, the pressure ought to be directed. When the patient almost involuntarily throws the muscles underneath into action, upon commencing the examination, acute disease of some part or other may be suspected. The state of the surface, in respect of moisture, temperature, softness, colour, &c.; and the sensibility, the elasticity, the degree of depression, fulness, pulsation, &c. of this region; are equally deserving of notice. In difficult or doubtful cases, *percussion*, particularly if aided by PIORRY's pleximeter, will be of service in giving information as to the presence of air, or of effused fluids, or of enlargement of the subjacent viscera.

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II. EPIGASTRIUM — Contusions and Concussions of.

Classif. — I. Class, I. Order (*Author*).

13. Blows on the epigastrium, or falls, and concussions of the trunk, may give rise to the most serious consequences, and even to immediate death. The manner in which these effects are produced has not always been correctly estimated, although they are amongst the most familiar phenomena which present themsent themselves. A blow on the epigastrium may seriously affect the frame from its effect — 1st, upon the stomach; 2d, upon the liver, gall-bladder, or spleen, either of which it may rupture, particularly when congested, or in a state of disease; 3d, upon the digestive canal, some part of which may be ruptured by it; 4th, upon the diaphragm and respiratory organs; 5th, upon the actions of the heart; 6th, and lastly, upon the great ganglia and ganglial nerves. In a person in previous health, I believe, from an attentive examination of the phenomena consequent upon the injury, that the immediate effect is produced upon these ganglia, and is analogous to that occasioned by concussion of the brain. In some cases, the stomach or other parts enumerated, may suffer, according to the nature and the direction of the blow; as in a case recorded by Duponchal, in which the jejunum was ruptured; and in one seen by myself, many years since, in which the spleen, which had been much enlarged, was ruptured. A distended gall-bladder is, however, most obnoxious to this contingency, if it be distended with bile on the receipt of the injury.

14. i. Symptoms. — *a.* The patient generally falls to the ground, pale and motionless, with the most distressing death-like sensation. The skin is cool, damp, and pale; the breathing is feeble, often scarcely perceptible, and slow. The eyes are fixed, the countenance collapsed, the lips pale, and the pulse at the wrist scarcely perceptible, or irregular and intermitting, or not to be felt. The surface and extremities become quickly cold; the muscles are flaccid, the joints pliable; and, in some instances, the sphincters are relaxed. If the powers of life be not rallied at this time, all these phenomena increase, until the action of the heart and respiration entirely cease. If *death* follow, the blood generally continues fluid, the limbs flaccid, and cadaveric changes quickly supervene. The changes, in the most severe cases, somewhat resemble those produced by lightning. In some instances, one or more of the organs, above enumerated, are injured, either in conjunction with these changes, or independently of them.

15. *b.* These are the more direct effects, which may terminate rapidly in death when the injury has been severe. But when slighter, or when a judicious treatment has rallied vital power, a different train of symptoms appear. The patient is enabled to speak; he complains of pain and anxiety at the epigastrium, with remarkable tenderness; the pulse returns, and the surface recovers its temperature. At last, symptoms of intense reaction supervene: the pulse becomes full, strong, and quick; the epigastrium and abdomen tumid or tense; the eyes sunk and red; the face sharpened, pale, and anxious; the tongue and mouth dry, with great thirst, but generally without either sickness or vomiting; and pains are felt in the limbs, and different parts of the body, with restlessness. Such are the usual phenomena characterising the reaction, when no particular organ is seriously injured, or inflamed. The stomach, or the liver, or even the peritoneum, or one or more of them, often becomes inflamed in the course of the reaction, owing to the injury it had received. In this case, the particular signs of such lesion will be superadded; as constant vomiting upon taking matters into the stomach, and pain in the region of this viscus, when it is inflamed; tenderness and pain in the right hypochondrium and epigastrium, when the liver is affected; and so on as respects the other organs.

16. ii. Treatment. — The means of cure are very different at the different periods distinguished above. — *a.* In the *first* period, remedies should be promptly employed, but with caution. Internal stimuli are dangerous, from their liability to induce fatal inflammation, particularly of the stomach. External warmth, and hot stimulating baths, are generally beneficial, especially when aided by irritating frictions. In plethoric and robust subjects, cupping over the hypochondria, notwithstanding the depression, and abstracting a moderate quantity of blood, so as to give greater freedom of action to the heart and blood-vessels, will be of service. But experience has shown, not merely in one country, but in all, that animal warmth, derived from a recently killed animal, is the most effectual means of rallying the depressed powers of life in cases of this kind. Ambrose Paré advises the skin stripped from a sheep as soon as it is killed, to be wrapt round a person whose life is menaced by the first shock of a contusion. M. Larrey has resorted to it, in several cases, with instant benefit, one of which is detailed by M. Duponchal. M. Larrey states, that some sailors, shipwrecked on the coast of Labrador, were found by Esquimaux Indians almost dead with cold and fatigue; and that they were recovered by these kind savages, who enveloped their bodies in the warm hides of newly killed animals, and chafed their limbs with hot aromatic liquors, — a proof of the frequent superiority of even rude observation, to fine-drawn inferences from theory, the grounds of which have either been assumed without investigation, or received as the dictum of current but worthless authority. The inhabitants of Upper Egypt, according to M. Pugnet, resort to similar applications, to severe injuries; and analogous means, particularly warm eviscerated animals, applied over the trunk, and the almost living flesh of pithed quadrupeds, are in common use among the vulgar in northern countries, in cases of contusion, &c.

17. *b.* In the *second* period, or that of reaction, general and local depletions, the tepid bath and fomentations, camphorated and stimulating

embrocations or liniments, blisters over the epigastrium or abdomen, emollient and gently refrigerant drinks, and aperient enemata, are the principal remedies. Great caution should be exercised during convalescence, as to the patient's food and drink; the former of which ought to be chiefly farinaceous, and in small quantity at a time; the latter bland, and between the temperature of 70° and 90° of FAHRENHEIT's scale. If symptoms of inflammation of the stomach, or of any other part, appear during reaction, the treatment should be directed accordingly.

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EPILEPSY. SYN. — Ἐπιλῆψια, Ἐπιλῆψις (from ἐπιλαμϐάνω, I seize, I attack). *Morbus Sacer*, Hippocrates. *Morbus Major*, Celsus. *Morbus Herculeus*, Aristotle. *Morbus Comitialis*, Pliny et Seneca. *Morbus Convivalis*, Plautus. *Morbus Lunaticus*, Aretæus. *Analepsia*, Riverius. *Apoplexia parva; Caduca Passio; Morbus Sonticus, Caducus, Astralis, Sideratus, Scelestus, Dæmoniacus, Deificus, Divinus, Sancti Johannis, fœdus, puerilis, insputatus; Peditio; Epileptica Passio; Cataptosis*, var. Auct. Lat. *Epilepsie, Mal-Caduc, Mal de St. Jean*, Fr. *Fallsucht, Die Fallende Sucht*, Germ. *Mal Caduco*, Ital. *Falling Sickness*, &c.

CLASSIF. — 4. *Class*, 3. *Order* (*Cullen*). 4. *Class*, 4. *Order* (*Good*). II. CLASS, III. ORDER (*Author*, in *Preface*). See CONVULSIONS.

1. DEFIN. — *Sudden loss of sensation and consciousness, with spasmodic contraction of the voluntary muscles, quickly passing into violent convulsive distortions, attended and followed by sopor, recurring in paroxysms often more or less regular.*

2. Epilepsy has been noticed by all the ancient writers; but by none so fully and accurately as by ARETÆUS. The sudden and frightful seizure of which it consists, induced them to refer it to supernatural causes; and hence originated several of the names which have been applied to it. Notwithstanding the very numerous results of observation accumulated by the ancients, and still more remarkably by the moderns, its nature and treatment are very imperfectly known. There is, perhaps, no other malady of which the treatment has been more empirical than of it; and this opprobrium must necessarily continue until our knowledge of its pathological relations is much further advanced than at present. In the *description* I am about to give of this disease, its more distinctly marked states will be *first* considered, and afterwards the varieties into which it has been divided, according to the modifications and complications it usually presents in practice. It will appear in the sequel how very nearly it is related to *apoplexy* on the one hand, and to *convulsions* on the other, — in its more *idiopathic* states, to the *former*, to *mania, maniacal delirium*, and *idiotcy*; and in its *symptomatic* states, to the *latter*, to *hysteria, ecstacy*, and some other nervous affections. But the relations and complications of epilepsy, and the transitions of it into these maladies, as well as of those into it, will be noticed hereafter; and the disease will be treated of as it actually presents itself to the practitioner, and not as it is usually described by systematic writers, who have viewed it (and, indeed, all other diseases) as a distinct species, and not as it commonly occurs — as a concatenation or group of morbid phenomena, which varies infinitely in form, intensity, and combination, and consequently approximates more or less nearly to other morbid actions, particularly of the same system or organ, and which may either pass into them, or appear in their course.

3. I. DESCRIPTION, &c. — In order to entertain satisfactory ideas of the nature and morbid relations of epilepsy, it should be studied as to — 1st, the phenomena which precede its evolution; 2dly, the signs indicating the approach of the paroxysm; 3dly, the paroxysm itself, and the phenomena immediately consequent upon it; and, 4thly, the intervals between the seizures. M. ANDRAL has adopted a nearly similar arrangement, which, however, is merely a modification of that of J. FRANK, the latter, upon the whole, being the preferable of the two. Having described the more regular states of the malady, I shall take a brief view of its varieties and complications.

4. *A. The phenomena preceding the evolution of the disease.* — J. FRANK remarks that, of three hundred cases, the early history of which he had the opportunity of investigating, very few occurred in persons who had been perfectly healthy previously to the accession of the disease. This, however, had not escaped RIVERIUS and TISSOT, the latter of whom has treated specifically "*On the Diseases which precede Epilepsy.*" This malady attacks chiefly those persons who had been subject to convulsions during their first dentition; to tinea capitis, or other chronic eruptions in early life; to diseases of the head, violent affections of temper, or to disorders of mind; to an unbridled indulgence of the passions; to diseases of the ear; to affections of the glandular and lymphatic system; to worms, to chorea, or to hysteria, at any period previously to the epileptic seizure. Many of these antecedent disorders may be viewed either as predisposing or exciting causes; or as indications of those early disturbances of the nervous systems, and of the circulation of the cerebro-spinal centres, that lead on to further changes, when left to themselves, until the fully formed epileptic seizure is the result. Thus, it is not infrequently remarked that epileptic patients have, long before the accession of the disease, complained of tremors, cramps, vertigo, partial paralysis, disorders of sensation, chorea, stammering, palpitations, epistaxis, &c.; or have received injuries on the head. The relations of these with the seizure, as well as of those noticed above, must be obvious to all. There are also other disorders which precede the disease; but which, being more intimately related to its causes, will be noticed hereafter.

5. *B. Phenomena premonitory of the seizure.* — As this disease rarely attacks a sound constitution, or person previously in good health, so each paroxysm frequently is preceded by some indication or other of its approach. Instances, however, are common, of persons being seized without any intimation, and even in the daytime, as suddenly as if struck by lightning. WEDEL, HENKE, and J. FRANK refer to several such. The last writer thinks it a rare occur-

rence; but I agree with ESQUIROL, in considering it by no means uncommon, particularly in the *idiopathic* form; the *symptomatic* form being generally preceded by some indication. In two cases at present under my care, the seizures are instantaneous and unexpected: and I have met with several such, chiefly in those idiopathically affected, or who have inherited the disease.

6. The *premonitory signs* of the fit are, generally, increased sensibility, or a sense of formication of the surface, or of some particular part, as the arm, back, breast, &c.; cramps; turgidity of the vessels of the head; redness of the countenance; a peculiar, anxious, or fixed look; heaviness or obtuse pain of the head; vertigo, or particular sensibility, or a feeling of emptiness or coldness in the head; a great paleness of the face, and paleness or blueness of the lips and gums; a deeper sleep than usual; sleeplessness, or sleep attended by startings or peculiar succussions of various parts of the body, or disturbed by singular dreams and visions, or by the nightmare; a sensation of sinking, or leipothymia, when falling asleep; unusual states of temper; irritability, or marked disposition to anger; various hallucinations, or spectral illusions; great timidity, or unusual depression or serenity of mind; anxious deportment; great hilarity or mental excitation: an uncommon feeling of strength, or of robust health; sudden loss of recollection, confusion of ideas, or forgetfulness; unsteady gait; a desire of motion, or an irresistible impulse to run forwards; shivering of the limbs; dimness of sight; red or black objects, or coruscations or scintillations, before the eyes; trembling of the iris, or alternate contractions and dilatations of the pupils; temporary loss of sight, double or partial vision, or strabismus; a rush of tears; deafness, or a sense of humming, roaring, or other noises in the ears; a morbid perception of colours, of odours, or of flavours; a sense of sweetness in the mouth; a flow of saliva; violent sneezing, hiccup, frequent yawning, attended by a feeling of anxiety at the præcordia; pandiculation; difficulty of articulation, or stammering; distortion of the countenance; spasmodic affections of the larynx; fainting, or leipothymia; palpitations; borborygmi; a sense of constriction in the fauces, throat, thorax, or abdomen; cramps in the stomach; great voracity, or unusual craving of the appetite; a copious discharge of watery or offensive urine, or hæmaturia; a peculiar fœtor of the fæces; more frequently eructations, nausea, and vomiting, or other dyspeptic symptoms; and still more commonly the *aura epileptica*. J. FRANK saw the paroxysm preceded by an eruption, over the whole body, excepting the face, of the *vitiligo alba*. He states, that in twenty-one epileptics treated in the clinical wards of the hospital at Wilna, vomiting announced the paroxysm in seven.

7. More than two or three of the foregoing symptoms seldom exist at the same time; but they sometimes precede one another. Thus, in a case which I lately attended, the patient was unusually excited in the morning, was restless, could not sit in one place any time, and desired me not to call again, as he never felt better in health and spirits than he did at that time. As I had been seeing him from time to time, on account of an indifferent state of health, I requested his friends to watch him. In the afternoon, he turned pale, felt very cold, complained of pain in one eyeball, became sick, vomited, and instantly was severely seized. Another patient felt an unusual craving for food, with faintness, sunk and pallid features, most distressing sense of sinking, followed by violent palpitations; and directly afterwards, experienced a severe paroxysm; the pulse becoming irregular and intermitting during its continuance. The sensation of a *cold or warm aura* proceeding from some part, and ascending to the head, but very rarely descending from the head to another part, is one of the most common precursors of the fit. In some cases, the *aura* has been felt to terminate at the epigastrium. The places whence it most frequently proceeds are, various parts of the upper and lower extremities, the groins, hypochondria, abdomen, loins, uterine regions or vulva, along the vertebral column, and from the vertex to the occiput. FERNELIUS mentions its occurrence at the vertex; and SCHELHAMMER, a case in which it commenced at this part, and proceeded to the arm. From whatever place the aura may arise, as soon as it reaches the head, or ceases, the patient loses all consciousness, and the fit is fully declared.

8. C. *Phenomena characterising and directly following the fit.*— It is only during the paroxysm that the characterised symptoms are observed. These may be so violent as to appear most frightful, or so slight or momentary as to be hardly observed, with every intermediate grade. This has led to the arbitrary distinction adopted by ESQUIROL, FOVILLE, CALMIEL, and ANDRAL, into the *Grand* and *Petit Mal*. The former, or fully developed paroxysm, may be divided into *three stages*.—(*a*) In the *first*, or that of *tetanic rigidity*, the patient, either without any premonition, or after having felt one or more of the precursory signs above enumerated, generally utters a scream or exclamation, of which he has no recollection afterwards, and instantly falls backwards, if standing. Sometimes he runs some steps forward, or turns so as to describe a semicircle or circle, and then falls to the ground. Rarely he turns rapidly around more than once, as remarked by KRIEGAL, WEDEL, BANG, VALENTIN, LÖBENSTEIN-LÖBEL, ESQUIROL, and J. FRANK; or is thrown into a sort of dancing motion,—a circumstance which led FABRICIUS to describe a variety of the disease by the name of *Epilepsia Saltator*. Directly afterwards the whole body assumes an almost tetanic stiffness; the head is drawn backwards; the eyes are generally open, and directed from the usual axis of vision; the limbs are thrown out forcibly, and become rigid; and the muscles of the thorax and abdomen firmly contracted. The pulse is either irregular, or natural, or slower than usual. The face is very pale, unless cerebral congestion precede the attack; and the respiration is impeded by the spastic contraction of the thoracic muscles. Occasionally, one half of the body is more affected than the other; and erection generally occurs in the male, with retraction of the testes. This stage is usually of very short duration, passing in some seconds, or almost instantaneously, into the next.

9. (*b*) In the *second stage*, or that of *convulsion*, the phenomena differ in no respect from those characterising the tonic form of CONVULSION

(§ 12.), excepting in the more profound insensibility attending it, which is so great that the patient may be subjected to the most painful applications without sensation being excited. The whole body is generally thrown into the most violent convulsions, so that, as ARETÆUS has remarked, the spectators dread the immediate extinction of life. The head is violently rotated, or tossed in every direction; the vessels of the head and neck are enormously swollen; the eye-brows, forehead, and scalp are much agitated or contracted; the hair is erect; the eyelids are either open, half shut, or convulsed; the eyes fixed, prominent, vacant, rolled about, or turned upwards, or out of their axis; and the pupils are either dilated, contracted, or natural; but the motions of the iris are very slow, or entirely abolished. This varying state of the pupils accounts for the different descriptions given by HENKE, SPRENGEL, METZGER, SCHMIDTMÜLLER, SCHMALZ, DRESSIG, and others. The face, which was generally at first pale, now becomes injected, tumid, and livid; the forehead contracted and wrinkled; the lips are at one time contracted, elongated, and pushed forwards, and at another drawn forcibly backwards; the teeth are gnashed; and the jaws so forcibly moved as to produce a remarkable stridor, or even to break the teeth. VAN SWIETEN saw dislocation of the jaws owing to their violent action. The tongue is generally swollen, livid, forcibly protruded between the teeth, and more or less injured in consequence. The arms are tossed about violently or struck against the chest; and the hands and fingers rapidly perform the motions of flexion, extension, &c. The lower extremities are similarly convulsed. The thumbs are drawn inwards, and the toes incurvated. The convulsions are often more violent on one side than another. In some cases, much fulness of the abdomen and hypochondria is observed, often with borborygmi or singultus.

10. *Respiration*, which was at first interrupted by the spasm of the thoracic muscles, and performed as if the chest were placed under a load, or as in the act of strangulation or suffocation, until a state of partial asphyxy was produced, now becomes quick, short, irregular, and sonorous. The patient sometimes screams, or utters the most unnatural and prolonged sounds, or the most extravagant expressions, but more frequently moans piteously; and the forcible expirations throw out a white tenacious froth, sometimes coloured with blood, over the lips. TISSOT has observed the saliva sometimes to possess a cadaverous odour; and MACBRIDE and others have remarked, in rare instances, blood to escape from the ears: epistaxis is more common. The *pulse* is often quick and small, but it is felt with difficulty; and is usually irregular, becoming more distinct, slower, and more languid towards the close of this stage. The action of the heart is loud, vehement, or tumultuous; and that of the carotids much increased. Flatus is often expelled involuntarily, sometimes with the fæces and urine; and the erection is occasionally followed by a discharge of semen, or of the prostatic secretion. At last the convulsions subside; fœtid perspirations break out about the head, neck, and breast; the interrupted and convulsive respiration is followed by deep sighs; and the spasms of the muscles, by subsultus; vomiting or eructations sometimes occur, and the patient passes into the next stage. The duration of the first and second stages varies from less than one, to fifteen or twenty minutes. If they be prolonged beyond this, death is generally the consequence; which, in the most violent cases, may also occur in the first stage, from the asphyxy occasioned by the spasm of the respiratory muscles; or in the second, from the degree of cerebral congestion and its more direct effects.

11. (*c*) The *third* stage, or that of *collapse*, is the most prolonged, and is characterised by a continuance of the loss of consciousness, by the disappearance of the convulsions, by the deep and often snoring sleep into which the patient falls, and by the gradual return of the sensibility, which may be now momentarily roused by powerful excitants. The perspiration which had broken out at the close of the last stage becomes more copious and general, and continues for about an hour; the pulse is now fuller, softer, and sometimes slower; the respiration freer and easier; and after a while the patient awakes as from a deep sleep, and is restored to perfect consciousness; but is stunned, or wearied and exhausted, and complains of headach, or pain in the neck or occiput. Sometimes the eyes remain, for a considerable time, fixed, dull, or squinting, and the pupil enlarged. The patient has no recollection of what has passed. His speech often falters; and he occasionally feels greater weakness in some one limb or other. These symptoms gradually disappear, but disinclination to exertion remains.

12. *The duration of the whole paroxysm* is generally from five or ten minutes, in the slight and imperfect cases, to three or four hours. M. ESQUIROL has seen it continue five hours. I have seen it last more than four; and in one case seven hours, the seizure consisting of two fits, with an indistinct interval of soporose exhaustion. The long attacks generally consist of two or more short fits, a slight remission taking place between each. The *return* of the fits is extremely various in different cases. Several years may elapse between the seizures, as in a case in which I was recently consulted; or one, two, or three years may intervene. In a few cases, they have appeared every year at the same period, or even day. When they occur monthly, a stated day is more frequently observed, which often coincides with the new or full moon,—a coincidence much insisted on by GALEN, ARETÆUS, ARNOLD of Villanova, GEHLER, HOFFMANN, MEAD, and others. The interval of a lunar month is more commonly noticed among females, from the connection of the disease with the uterine functions. In some instances, the paroxysms occur every week, on the same day; and occasionally every day, or night, at the same hour; but they most frequently come on when first falling asleep, and are often, for a time, unsuspected or overlooked. Sometimes several slight seizures take place in one day; but their recurrence is often extremely irregular. When they are neglected, they usually either become more and more severe, or occur after shorter intervals. Consciousness and sensation being abolished, *pain* cannot be felt, during the fit.

13. The *slight or imperfect seizures*—the *Petit Mal* of French writers — are very varied in cha-

racter. They often precede, for months or years, the full evolution of the severe form of the disease. Generally they consist of loss of consciousness, and slight rigidity, spasm, or convulsions of a few muscles, or of one or more limbs, which continue only one or two minutes. In still slighter cases, the patient is seized with vertigo, loss of consciousness and sensation, and muscular collapse or slight spasm of a few muscles, and is, after some seconds, completely restored. In some instances, the eyes of the patient become fixed and vacant; he attempts to articulate, but is unable; loses consciousness for a very few seconds; and, upon recovering it, takes up the thread of discourse which the seizure may have interrupted, and endeavours to conceal the occurrence. Occasionally the slight seizures very nearly approximate those of hysteria, or are associated with several hysterical symptoms. In many instances, the patient does not fall to the ground, although he may have been standing at the time of attack; and in others, consciousness is not entirely abolished, the patient retaining a vague recollection of what passed in the seizure, upon recovery from it, as after temporary delirium or dreaming. These slighter fits may recur either frequently or very rarely, but they commonly return after short intervals, and sometimes as often as several times a day.

14. *D. Of the intervals between the paroxysms.* — After the fit, the patient complains of lassitude, of soreness of the limbs and of parts that have been injured, and is pale, sad, and fearful of its return. In some severe cases, the face is studded, particularly about the eyes and temples, with numerous small ecchymoses arising from minute extravasations from the extreme capillaries of the *rete mucosum* during the congestion to which they had been subjected in the paroxysm. In rare cases, vomiting or purging of blood is observed, owing most probably to sanguineous exhalation from the congested capillaries of the digestive mucous surface. Sometimes paralysis of a limb, more or less complete, or strabismus, or even irregular movements or convulsions, or various hallucinations, follow the severer attacks, and continue several hours, or even days. In a case to which I was very recently called, paralysis of the left arm, and severe pain in the right eye-ball and temple, continued after the fit — the former for some hours, the latter for several days. Deafness, watchfulness, terrifying dreams, slight or passing delirium, occasional convulsive movements (ARETÆUS, &c.), and fits of absence or forgetfulness, often afflict the patient, either for some time after an attack, or during the whole interval. Between the complete paroxysms, as well as before their evolution, the slight seizures, described above (§. 13.), in one or other of their forms — sometimes so slight as to amount merely to vertigo with momentary loss of consciousness, or spasm of some part — the *Vertige Epileptique* of French writers, are very common. Various signs of mental alienation often appear, which generally become more and more remarkable after successive, more frequent, or severer attacks, until insanity is the result. Epileptics commonly experience, during the intervals, various dyspeptic disorders; but their appetites are usually very keen, and seldom duly restrained. J. FRANK states, that he has seen persons suffer little disturbance after a fit, and others display increased activity of both mind and body, until its approaching return; but this is a rare exception; the great majority, even of those who suffer the least, being incapable of devoting themselves to any undertaking with attention and perseverance.

15. II. CONSEQUENCES AND TERMINATIONS.— Persons long afflicted by the disease, gradually acquire a peculiar physiognomy, owing to the repeated distension of the vessels of the head, and to the frequent spastic and convulsive actions of the muscles of the face during the paroxysms. This is particularly the case in such as are addicted to masturbation — a baneful practice which is common among epileptics, and, indeed, a principal cause of their malady. This alteration of the features has been noticed by ARETÆUS, who mentions their pale or leaden complexion, and their languid dejected look: but DUMAS and ESQUIROL have described it most accurately. The individual features become coarse; the lips thick; the lower eyelids swollen; the eyes unsteady, full, and prominent; the look vacant; the pupils dilated; the cheeks pale; the finest countenances plain; the muscles of the face subject to twitchings, or slight convulsive movements; the arms and limbs thinner than the rest of the body; and the gait peculiar. The functions of organic life likewise languish, obesity or emaciation being a common result. When the disease appears or continues after puberty, or the fits return frequently, the mental as well as the bodily powers become greatly impaired. These consequences are, however, in some respects connected with the states of nervous function, and the circulation within the head directly producing the seizures; the pathological conditions, which, at their commencement, and in slighter degrees, occasion the epileptic seizures, giving rise, in their advanced course and heightened grades, to various associated maladies. After the continuance of the disease, the patient is at first listless, incapable of energetic exertion, and sometimes hypochondriacal. He is liable to attacks of stupor, and complains of lassitude, flatulency; of various forms of indigestion, generally attended by a craving appetite; of great torpor of the bowels; of vertigo and tremors, &c. He is subject to deafness, amaurosis, and, in prolonged cases, to irregular muscular contractions, or paralytic tremors, to partial paralysis or complete hemiplegia, to imperfections or even loss of speech, to apoplexy, to melancholy, to partial or complete, or to intermittent or continued insanity, and to mania and idiotcy.

16. Notwithstanding that epilepsy seldom passes into the apoplectic state, until after repeated fits, yet both maladies may be associated in the very first seizure. (See § 40.) Insanity and mania, although not generally appearing until after several or many attacks, are by far the most frequent consequences of epilepsy; but I believe much more so on the Continent than in this country; whilst apoplexy and paralysis oftener supervene here than there. VAN SWIETEN states, that persons who have become insane at an early age, have been generally first epileptic. ESQUIROL has come to a similar conclusion; and my experience confirms it; the seizures, however, having been sometimes of an irregular convulsive kind, rather than those of true epilepsy. In

this frequent class of cases, the mental faculties are gradually impaired; sensation and memory are weakened, the former being often acute; perception and imagination perverted; various hallucinations generated; and the patient lapses into a state of incurable insanity or imbecility, or passes from the former into the latter. The more severe the fits, the more is this result to be dreaded. Sometimes violent attacks of mania follow the paroxysms, Of 289 epileptics in the *Salpêtrière*, in 1813, 80 were maniacal, and 56 in various states of mental alienation and imbecility. In 1822, out of 339 cases in the same hospital, there were 2 monomaniacs, 30 maniacs, 34 furious maniacs, 129 insane for some time after the paroxysms, 16 constantly insane, 8 idiotic; 50 upon the whole reasonable, but with impaired memories, and liable to occasional slight delirium, and tendency to insanity; and 60 without aberration of intellect, but susceptible, irascible, capricious, obstinate, and presenting something singular in their characters. As this institution receives chiefly old and severe cases of epilepsy, it furnishes sufficient illustrations of the consequences of this disease. Occasionally the epileptic mania alternates with melancholia and a desire to commit suicide; the mania often preceding the paroxysm. Dr. CHEYNE states that he has known epileptics preserve their intellects to a very old age; but this is only the exception to the general rule, for they seldom live to a great age, or retain their faculties when they reach it.

17. The *duration* of the disease is most uncertain and various, and depends upon numerous circumstances connected with the regimen, habits, and treatment of the patient. Epileptics are most injuriously addicted to the indulgence of the appetites for food, and for the sex, — practices which should as much as possible be guarded against, as tending not merely to counteract the good effects of treatment, but also to induce the unfavourable consequences of the seizures enumerated above. A *favourable* termination is indicated by the fits being slighter, shorter, and more distant. Sometimes a marked crisis occurs — as the return of a suppressed evacuation, particularly the menstrual and hæmorrhoidal fluxes, epistaxis, &c., the reappearance of a repelled eruption, &c. An attack of continued fever has removed the disease, — but very rarely when it has become confirmed. M. ESQUIROL states, that in 1814, when typhus fever raged in the Salpêtrière, although upwards of fifty epileptics were attacked by it, and but few died, little or no amelioration was observed in any.

18. A person subject to epileptic fits may *die* of other diseases, or of a malady proceeding from an increased grade of the same changes, which, in a less degree, occasioned the fits; or of the direct or indirect effects of the repeated seizures; death taking place sometimes in the intervals, but more frequently during the paroxysm or soon afterwards. When it takes place in the interval, it is occasioned by the remote effects of the fits, in connection with the pathological states inducing them — by some one of the diseases consequent upon them (§ 38. *et seq.*). If it occur during or soon after the paroxysms, it is generally owing to an augmented degree of the same changes usually producing them, or to some further alteration directly proceeding from these changes; either *apoplexy* caused by excessive congestion within the head, or by extravasation of blood in some situation, or by effusion of serum in the ventricles or between the membranes of the brain; or *asphyxy* occasioned by similar lesions affecting the medulla oblongata and upper part of the spinal chord, being the immediate cause of dissolution. It has been supposed, that suffocation often occurs in the paroxysm, owing to the position of the patient, or of the clothes around him when in bed. But this, I believe, rarely takes place; and when suffocation, or rather asphyxy, is met with, it is caused chiefly, if not altogether, by some one of the changes just stated.

19. III. CAUSES. — i. *Predisponent.* — *Hereditary disposition* is a remarkable predisposing cause of epilepsy, notwithstanding this kind of influence has been disputed in respect of it. But although the father or mother of the patient may never have had an attack, either of the grand-parents, or uncles, or aunts, may have been subject to it. ZACUTUS LUSITANUS (*Prax. ad Mir.* l. i. obs. 36.) mentions the case of an epileptic man who had eight children and three grandchildren afflicted by the disease. STAHL (*De Hæred. Dispos. ad var. Affect.* Halæ, 1706, p. 48.) and REININGER adduce instances of the whole of the members of a family being attacked by it at the period of puberty. BOERHAAVE (*Aphorisms*, 1075.) remarks that, like several other hereditary maladies, it often passes over alternate generations; and he adduces an instance (*Prax. Med.* t. v. p. 30.) in which all the children of an epileptic father died of it. I had, in 1820, a brother and sister some time under my care, who inherited the disease from their father, and they had two other brothers and one sister also subject to it — in all five. The fits appeared in all of them about the period of puberty; and one of the brothers died about the age of forty, from apoplexy, complicated with the seizure. MM. BOUCHER and CASAUVIEILH state that, in 110 patients, respecting whom they had made the enquiry, 31 were hereditary cases; and M. ESQUIROL found, that in 321 cases of epileptic insanity, 105 were descended from either epileptic or insane parents. Predisposition is often connected with *congenital formation.* I have seen the disease in several children, whose heads were of an oblique or diamond shape, or otherwise ill-formed; one side being more elevated than the other, and either side advancing or receding. Peculiarity of constitution, or *idiosyncrasy*, seems to predispose to it, as well as the epochs of *childhood* and *puberty*, at which periods the nervous and muscular systems are endowed with their greatest sum of sensibility and irritability, and the whole frame with great susceptibity. Cases, however, often occur in which these properties are rather diminished than increased. After puberty is fully attained, the disposition to the disease is greatly lessened.

20. The influence of *sex* is not remarkable; and is not manifested until after the second dentition. According to ESQUIROL and FOVILLE, females are more subject to the disease after this epoch than males. At the end of 1813, 162 male epileptics were in the *Bicêtre*, and 289 female cases in the *Salpêtrière*. J. FRANK found, that of 75 patients, 40 were females; but he agrees

with CELSUS, HEBERDEN, and SOEMMERRING, in believing, that if a strict diagnosis were established between this and other convulsive diseases to which females are very liable, particularly several of those seizures described in the article CONVULSIONS, the predominance would be found on the side of the males; and Drs. COOKE, ELLIOTSON, and CHEYNE are of the same opinion. MM. BOUCHET and CASAUVIEILH ascertained, that of 66 female epileptics, 38 were seized before their first menstruation, and 28 subsequently to that epoch. I agree with M. FOVILLE in thinking the disease more prevalent in the *lower* than the upper *classes.* M. ESQUIROL states, that the melancholic *temperament* is more disposed to it than any other. Dr. PRICHARD seems nearer the truth, in saying that it is common to all temperaments and *habits;* but it is not *equally* common to all. Dr. COOKE remarks, that almost every case he has seen has occurred in sanguine temperaments and plethoric habits. This does not agree with my experience, which leads me to infer that it is most frequent in persons who are either very plethoric or very much the reverse. Its greater prevalence in persons of a *scrofulous* and *rickety diathesis,* than in any other, has been shown by HUFELAND and PORTAL, and is undoubted. J. FRANK remarks, that more than half the cases in his practice were strumous. Dr. CHEYNE would make the proportion even larger. DE LA FONTAINE and FRANK found epilepsy extremely common amongst those born of parents affected by the *Plica Polonica.* An exhausted state of frame occasioned by whatever means, a cachectic habit of body, the syphilitic and mercurial poisons, and scorbutus, also dispose to the disease. Great activity of the mental faculties, and an exalted or excited state of mind, may predispose to it; and in proof of this, the circumstance of JULIUS CÆSAR, MAHOMET, PETRARCH, COLUMNA, FRANCIS RHEDI, ROUSSEAU, and NAPOLEON, having been subject to it, has been adduced by authors. But in men of strong minds, and powerful talents, the disease has seldom or ever occurred until the nervous energy has been exhausted by exertion, or by the excitements and anxieties of life. SUETONIUS (l. i. cap. 45.) states, that it was only in the last part of his life that CÆSAR was seized with epilepsy; and that he had two attacks while he was engaged in business. It seems more prevalent in some countries than in others. This has been referred to peculiarity of climate, especially to cold and moisture. It is more evidently dependent upon moral causes, particularly to excessive and premature venereal indulgences, which are more common in some countries than in others; the disease being very prevalent in the South of Russia and Germany, in Poland, in Italy, and France— certainly much more so than in this country and the United States. HIPPOCRATES and TISSOT think it most frequent and severe in spring, but this is not remarkably the case, and has been denied by several writers.

21. It has been asked, Whether or no this disease is more common now than formerly? The dissolute habits of the ancient Greeks and Romans lead me to infer that it was at least as prevalent among them as with us. PANAROLI states, that it was very frequent among the rich and noble Romans, particularly during the acme and decline of their greatness, when the utmost luxury, dissipation, and debauchery prevailed among the higher classes under the emperors.

22. ii. The *occasional Exciting Causes* are remarkably numerous and diversified. Various circumstances may concur in exciting the first seizure; and where no marked predisposition to it exists, a concurrence of several causes is requisite to its production; but, when once produced, a single, and even a slight, cause may occasion subsequent attacks. This class of causes acts variously: — 1st, Many directly change the physical condition and circulation of the encephalon; — 2dly, Others affect the organic nervous influence and circulation of the brain, through the medium of the sensations, perceptions, and other operations of the mind; — and, 3dly, Some act upon various remote organs or parts; the brain and nervous system being only consecutively and indirectly affected. — (*a*) Injuries of the head; fractures, depressions of a portion of one of the bones of the cranium, concussions of the brain or spinal chord; tumours, and the numerous pathological changes in the brain, its vessels, and its membranes, or in the cranium, described in the articles BRAIN, and CRANIUM; partial or general inflammation of the brain, or of its membranes; diseases of parts immediately adjoining, as of the cranial bones, the scalp, the medulla oblongata, and spinal chord, the ear, eye, &c., or of the vertebræ, &c.; excessive hæmorrhage and discharges; hypocatharsis, or blood-letting carried too far; omitting accustomed and requisite evacuations; insolation; the suppression of otorrhœa, of porrigo, and other eruptions; prolonged sleep; and the metastasis of gout or rheumatism to the encephalon; are the principal causes which act in the *first* mode pointed out. — (*b*) All inordinate affections of the mind may induce a seizure in persons predisposed to it, either by exciting the nervous influence and cerebral circulation too far above the natural pitch, as joy, anger, fits of indignation, coition, &c.; or by depressing the one or retarding the other to a degree incompatible with the continuance of the vital functions — as terror, sudden alarm, grief, protracted anxiety, a sense of disgust, the impression of various odours, excessive mental application or exertion, &c., nostalgia, disappointments, unrequited or forbidden affection, longings after objects of desire, or love, &c. Prolonged want of sleep; very great or enduring pain; difficult dentition; great surprise; frightful dreams; appalling and distressing sights; seeing others in the paroxysm; nervous irritation, titillation, whirling rapidly round; excessive sexual intercourse and masturbation; ill-controlled states or flights of imagination, &c.; are also very common and powerful causes. M. ESQUIROL, whose experience in this disease has been unequalled, truly states that fits of passion, distress of mind, and venereal excesses hold the next rank to terror, &c. in exciting the disease. — (*c*) The causes which act in the *third* mode are extremely numerous; persons who have become subject to the disease often experiencing a seizure from very slight occurrences. The most common are, however, the indulgence in too much, or in improper food; a heavy meal taken shortly before retiring to rest; the use of spirituous and fermented liquors, or of coffee, in excess; very high temperature, impure air, and

crowded assemblies; exposure to great cold; irritation of worms or morbid matters in the prima via; various acrid, narcotic, and acro-narcotic poisons, &c. There are several causes, the operation of which is either not well known, or connected with the diathesis and peculiar predisposition of the patient; and others — as, indeed, many of those just enumerated — which manifestly act in more than one of the ways pointed out above. The most remarkable of these are disorders of other organs or parts, particularly functional or structural diseases of the heart, of the digestive canal, of the liver, and of the generative or urinary organs; the presence of a *calculus* in either the kidney, the ureter, or bladder (BARTHOLIN, DE LA MOTTE, BRENDAL, SAUVAGES, &c.), or of a *gall stone* in the ducts (JENS, BEAMES, &c.); the irritation or lesions of remote nerves; the syphilitic and mercurial poisons, &c. (LARREY).

23. Dr. HEBREARD ascertained that, of 162 male epileptics in the *Bicêtre* at Paris, 119 were unmarried, 33 married, and 7 widowers. According to LOCHER (*Observ. Pract. in Vien.* 1736, p. 36.), out of 80 cases, 60 were occasioned by frights of various kinds and degrees: but, of 69 cases, MM. BOUCHET and CASAUVIEILH found only 21 that could be referred to this cause. The excitation of the feelings or passions produced by dramatic performances has also brought on an attack. J. FRANK states that, before epileptics were separated from the other patients in the wards of the Civil Hospital in Vienna, it was not uncommon for some of the other patients to be seized with the disease from sympathy or *imitation* upon seeing the epileptic paroxysm. This has been observed by BAGLIVI (*Opera*, l. i. cap. 14.), LETTSOM (*Mem. of Med. Soc. of Lond.* vol. iii. p. 383.), DUNCAN (*Med. Cases*, Edin. 1778.), AASKOW (*Coll. Soc. Med. Haun.* vol. ii. p. 14. 22.), MEZA (*Comp. Med. Pract.* fasc. v. p. 15.), and HARDY (*Lond. Med. Gazette*, vol. xi. p. 247.). I have seen it occur in one instance; but I believe that the form of *convulsion* described in § 17, 18. of that article is more frequently produced by this circumstance than true epilepsy, unless in persons liable to this malady. Various writers, particularly GALEN (*De Diebus Criticis*, l. iii. c. 2.), ARETÆUS (*De Caus. et Sig. Morb.* l. i. c. 4.), ALEXANDER TRALLIANUS (l. i. c. 15. 21.), CAMERARIUS (*Memorab.* cent. ii. n. 38.), RIVERIUS, F. HOFFMANN (*Institut.* l. iii. c. 88.), STAHL, MEAD (*De Imp. Solis et Lune, &c.* Lond. 1704.), WEDEL (*Ephem. Germ.* An. ii. decur. 2. obs. 148.), RUMPELT, BURMESTER (*De Morbo Spastico, &c.* Goet. p. 21.), OTTO (*De Planet. in Corp. Hum. Influxu.* Franc. 1805.), have insisted upon the more frequent occurrrence of the paroxysm at the periods of new and full moon than at any other. Indeed, lunar influence on this disease seems to have been generally believed in by the ancients; and hence one of the names given to it by them. The supervention of epilepsy during the early stages of the exanthemata, or upon the disappearance of the eruption, is much more rare than stated by many writers; for the seizures that sometimes take place in such circumstances are more strictly symptomatic convulsions, and seldom return afterwards, unless in those much predisposed to this disease. A similar remark also applies to the violent convulsive attacks, which occur during, or about the period of, parturition; and which, although they possess most of the characters of epilepsy, particularly of the uterine variety, do not necessarily return at any other period, or even on a subsequent confinement, unless in females who are really epileptic, who are very liable to dangerous seizures at this particular time.

24. Various nervous diseases sometimes pass into epilepsy, either of a simple or complicated form, — most frequently the latter. *Hysteria, chorea, catalepsy, cataleptic ecstasy, somnambulism*, and symptomatic attacks of *convulsion*, when neglected or improperly treated, occasionally terminate in confirmed epilepsy, with various associated disorders, and not infrequently in some one of the complicated states hereafter to be noticed. Numerous affections of the digestive organs have been assigned by writers as exciting causes. But I consider them, with the exception of worms in the *prima via*, which are a frequent cause, particularly in children, as coexistent with, or contingent upon, the commencement of that state of organic nervous power and circulation in the brain producing the disease, and that the disorders of the digestive organs, as well as this early state of cerebral affection, equally depend upon deranged vital manifestation throughout the organic nervous system.

25. IV. VARIETIES OF EPILEPSY. — Various divisions have been proposed with the view of fixing with greater precision the treatment which is most appropriate to the different phases of the complaint. ARETÆUS and other ancient writers distinguished it by the terms *acute* and *chronic*. One of the most commonly adopted divisions is that into *idiopathic* or cerebral, and *sympathetic* or originating in disorder of some other organ. PISO long ago doubted the existence of the sympathetic disease, and MM. GEORGET and BOSQUILLON have adopted his opinion. These writers contend, that the sensations, or disordered feelings manifested in remote organs, may actually have their seat in the brain; and that the aura felt in a distant part may depend upon an original cerebral affection. Those who believe in the sympathetic forms admit that the seat of the paroxysm is always the encephalon; its cause, or the disorder which excites the cerebral affection, on which the seizure depends, being often in other organs. Hence they subdivide the sympathetic species into as many varieties as there is disorder manifested in other organs — into the *spinal*, the *cardiac*, the *gastric, hepatic, intestinal, nephritic, genital* or *uterine*, the *nervous*, &c. SAUVAGES and SAGAR (*Systema Morborum, &c.* p. 442.) make as many varieties as there are principal exciting causes. VOGEL (*De Cognosc. et Curand. Corp. Humani Affectibus*, p. 404.) notices the *cerebral*, that depending upon *disorder of the digestive organs*, and that arising from *irritation of other parts*. Dr. CULLEN admits two species, the *idiopathic* and *symptomatic* — and distinguishes the former into the *cerebral*, the *sympathetic*, or that attended by aura, and the *occasional*, or that arising from some irritation; the latter into as many varieties as there are organs occasionally originating the disease. Dr. GOOD mentions three species — the *cerebral*, the *catenating*, and *complicate*. Dr. J. FRANK views epilepsy in connection, both with the organs from

which it seems to derive its origin, and with the states of action it manifests: these states he divides as follows — the *atonic, traumatic, inflammatory, rheumatic, metastatic, arthritic, carcinomatous, gastric, scrophulous, syphilitic,* and *complicated.* These distinctions are too complicated and unavailable in practice — are, in truth, as respects several of them, distinctions without differences. The arrangement adopted by Dr. PRICHARD is deserving of attention, as it comprises several of the most important sympathetic associations and complications of the disease; that, followed by Dr. CHEYNE, presents nothing novel or requiring remark. The *division* which seems to me most accordant with the states it commonly presents in practice, is that into — 1st, its *Simple forms;* 2dly, its *Sympathetic varieties;* and 3dly, its *Complications.*

26. i. *Simple Epilepsy, Epilepsia Simplex — Primary Epilepsy; E. Cerebralis, Idiopathica, Essentialis, Legitima, Primaria, Encephalica,* Auct. varior. — may present itself in various forms, as respects nervous susceptibility and vascular fulness and action. — It may occur in emaciated persons, whose nervous energy has been exhausted, and whose blood is deficient in quantity and quality, or in those who are plethoric and apparently robust. It may present symptoms of imperfect or sub-action, in connection either with deficiency, or with too great fulness of blood; or of increased action, especially as respects parts about the base of the encephalon. It is very important in practice to ascertain these states of the vascular system, as upon them must necessarily be founded the chief indications of cure.

27. *A. Simple Nervous or Asthenic Epilepsy — E. Simplex nervosa,* or *Epilepsy with defective power and action* — is not so common in this, as in other countries; yet it is not infrequent in London and large manufacturing towns. — It is observed in weak constitutions; in thin habits, presenting a deficiency rather than fulness of blood; in young persons employed in factories; and in those who are endowed with great susceptibility, and who have been addicted to venereal excesses, especially to onanism. In this form, the face is pale or sallow; the veins small; the pulse weak, small, and accelerated, or readily excited; the seizures are frequently ushered in by leipothymia or fainting; and the countenance is neither full nor livid, until the convulsive stage of the fit, and often not even then. It is probable that, at the accession of the attack, the due supply of blood to the brain is withheld, or the circulation of it interrupted; although it must be admitted that there may be evident want of nervous power, and general deficiency of blood, and yet vascular action may be increased within the head, relatively to the rest of the body. It is very important in practice, to ascertain which of these states exists on the accession of the fit; and this can be done only by examining the circulation in the carotids, the temperature of the head, and the action of the heart, at this and at other periods. This state of the disease may ultimately become complicated with insanity, imbecility, or paralysis.

28. *B. Simple Sanguineous Epilepsy — E. Simplex Sanguinea; Acute Epilepsy,* LÖBENSTEIN-LÖBEL and RICHTER; *Epilepsy with Plethora; E. Plethorica,* PORTAL and others; *E. with excited or sthenic action; E. with determination of blood* — appears to be the most common form of cerebral epilepsy, especially in this country. — It is usually observed in sanguine and plethoric habits, and is consequent upon too high living, great exertion, the suppression of accustomed evacuations and discharges, the disappearance of eruptions, or the translation of morbid action from other structures to the brain, exposure to the sun, and violent fits of passion. In these, as in other cases betraying increased vital action, the disease has been supposed by several writers to possess an inflammatory character — *E. Inflammatoria,* J. FRANK, PORTAL, and others. — There is every reason to suppose that this form is caused by an impeded return of blood from the head, as well as by increased determination to it; and that it is more frequently associated with disordered action of the heart and congestion of the liver, than is generally supposed. Although simple plethora, or determination of blood to the encephalon, may alone be sufficient to the production of the fits, yet these states will ultimately be followed, if the disease be not arrested, by partial or slow forms, of inflammatory action; and, consequently, in protracted cases, the malady will often pass into, or be complicated with, mania, phrenitis, apoplexy, or paralysis. In other cases, owing to the constitution of the patient and the nature of the exciting causes, the disease is obviously connected, from the commencement, with chronic inflammation of a partial or limited kind, inducing alterations chiefly in the medullary substance of the brain. The distinction, made by SAUVAGES, SAGAR, J. FRANK, and others, between the *inflammatory,* the *rheumatic,* the *metastatic,* and *arthritic* states of the disease, are not to be discovered in practice; as they all present signs of determination of blood to the encephalon, and of excited action: but it is of importance to keep these morbid relations in recollection, as they should very materially influence the treatment. The countenance in the fit is generally red, tumid, or livid, and is, with the head, covered by perspiration; respiration is at first interrupted, and afterwards sonorous and laboured; the convulsions are not very violent, nor of long duration; and the subsequent stupor is profound and prolonged. In the intervals, the patient is subject to vertigo, or temporary loss of consciousness. The *Syphilitic, Scorbutic, Cachectic, Humoral, Febrile,* &c. of BONET, HOFFMANN, SAUVAGES, &c. are merely occasional symptomatic or complicated states of the disease, the paroxysms often closely resembling those of simple convulsions.

29. ii. *Sympathetic Epilepsy; E. Sympathica; Epilepsy with associated disorder of other organs.* — This form is much more varied than the foregoing, not only as particular organs may betray disorder antecedent to, or coexistent with, or consequent upon, the explosion of the epileptic attacks; but also as it may present more or less of the features of either of the two states just particularised; epilepsy associated with especial disorder of some important organ, being, in respect of nervous power and vascular fulness, also either *nervous* or *sanguineous,* as described above (§ 27, 28.) — being oftener further characterised by defective tone and energy, and deficient fulness of blood, or by plethora and excited action. This

very important connection of morbid states, although appearing complex to the superficial observer, will not seem so to those who are in the habit of pathological analysis. It is chiefly owing to the circumstance of this species of investigation having been neglected as respects epilepsy, and to our consequent ignorance of the actual state of the circulation within the head, and of the heart's action, about the accession of the paroxysm, that our knowledge of the nature and treatment of the disease has advanced so little since the days of ARETÆUS.

30. *A. Epilepsy from affection of the spinal chord* — *E. Spinalis* of J. FRANK — has been elaborately described by HARLES (*Opera Min. ac Med.* t. i. 1825.). It generally arises from injuries and concussions of the spine; from caries of the bodies of the vertebræ, or inflammation of the intervertebral substances; and from inflammation of the membranes of the chord, or effusion of fluid within the sheath, from the metastasis of rheumatism, or the disappearance of eruptions, &c.; and is sometimes preceded by great sensibility, formication, or irritation of the skin. The fits are generally characterised by severe convulsions, seminal emissions, and relaxation of the sphincters. The head is seldom so much affected as in cerebral epilepsy, and the seizures often approach nearly, or altogether, to simple convulsions. One or other of the limbs is frequently weak, and sensation in them occasionally diminished, or otherwise altered, during the intervals. Mr. AUSTIN and myself lately attended a young lady, in whom the catamenia returned every fortnight in large quantity; and who afterwards had slight epileptic seizures. We found the spinous processes of the three upper lumbar vertebræ projecting, and that part of the spine painful, and tender upon firm pressure and percussion. The case terminated favourably from the treatment advised in this state. I believe that disease of the spine, associated with disorder of the uterine functions, and epilepsy or convulsions, is not rare. This form of epilepsy may be attended by great nervous susceptibility and deficiency of blood, as in the case now referred to; or by sanguineous plethora or excited action; either of the two pathological states characterising the simple malady also subsisting in this.

31. Very intimately connected with this variety is the supervention of the seizures upon pressure, irritation, laceration, or other *injury of nerves*. As in the spinal variety, so in this, the paroxysm, generally, is rather one of convulsions than of complete epilepsy. I do not believe that this and the spinal variety are more frequently preceded by an *aura* than the other forms; as this sensation may not depend upon any change in the part in which it seems to originate, but upon the condition of that portion of the brain or chord with which its situation is especially related. I have even met with cases in which the aura shifted from one limb to another in the course of treatment.

32. *B. With especial disorder of the circulating and respiratory actions.* — (*a*) I believe that the paroxysm is more commonly connected with disordered function of the *heart*, than is generally stated by writers. In many of the cases where I have had an opportunity of examining the state of the circulation, just before, or at the commencement of, the fit, the action of the heart has been either suspended for a few seconds, or remarkably slow or irregular. This connection has not been overlooked by some authors. QUERCETANUS (*Tetrad. de Affect. Capitis*, cap. 8.), indeed, assigns to this organ the seat of the disease; and instances have been adduced by MORGAGNI (*Epist.* lxiv. art. 5, 6.), LANCISI (*De Mortib. Subitaneis*, p. 113.), GOULD (*Philosoph. Trans.* vol. xiv. p. 537.), SPRENGEL, and BRERA (*Krank. d. Herzens. &c.*), in which the seizures commenced with fainting, followed by palpitations; and, after death, the cavities of the heart were found dilated, and containing fibrinous concretions. The numerous dissections of GREDING also show the frequent connection of the disease with lesions of this viscus. (See § 47.) Dr. REID has drawn attention to the subject in a more especial manner than any other writer, but in too general terms. "It will be found," he states, "that the first symptom of an attack is the suspension of the action of the heart; and, consequently, an intermission of the pulse, which may continue from a few seconds to about three minutes; which was the longest period of intermission I have yet seen." I noticed the affection of the heart in a young man, whom I attended in 1820; and in several cases since that time. But opportunities are comparatively rare in which the physician can examine the patient at or shortly before the accession of a fit. That the heart's action is interrupted at this period, in many cases, appears evident, on observing the symptoms, and tracing the connection between the exciting causes and their more immediate effects. When we consider that the most common and energetic causes, as fright, surprise, grief, anxiety, &c., are those which, although primarily affecting the cerebral functions, most remarkably disorder the actions of the heart, the importance of more frequently directing our attention to this organ, in our researches respecting the nature and treatment of epilepsy, will be evident. — (*b*) The disease can hardly be said ever to depend upon *disorders of the lungs;* although the function of respiration is very often remarkably affected, or even altogether arrested, owing to the sudden spastic contraction of the respiratory muscles in the first period of the paroxysm; and cases sometimes occur in which the frequent congestions of the lungs, from this cause, are productive of inflammation, or hepatisation, or even of effusions into the pleuræ. But such associations are merely consecutive; and are chiefly met with in prolonged and complicated cases, as shown by the researches of GREDING. (§ 47.)

33. *C. With disorder of the digestive organs.* — (*a*) When the *stomach* is the organ chiefly disordered — the *Epilepsia Stomachica* of SAUVAGES, CHEYNE, &c.; the *E. Gastrica* of FRANK and others — there are generally a loaded tongue, heavy or disagreeable breath and perspiration, unpleasant taste, acrid or acid eructations, cardialgia, a sense of distension at the epigastrium and hypochondria, and morbidly increased or even ravenous appetite; digestion being at the same time very slow and imperfect, especially just before the paroxysm. In some instances, the appetite is capricious or defective; and, occasionally, nausea and even vomiting occur. Not infrequently, large quantities of undigested food, some of which was taken two or three days pre-

viously, are vomited shortly after the fit. The bowels are usually torpid. This form, particularly in the paroxysm, generally assumes the character of the sanguineous or plethoric variety (§ 28.).

34. (*b*) Where the *biliary organs* especially betray disorder — the *Epilepsia Hepatica* of BURSERIUS, PRICHARD, and several nosologists — pain, fulness, or tenderness in the right hypochondrium, or towards the epigastrium, with flatulence, occasional hiccup, or quickened respiration, and a sallow or icteric countenance, are complained of, generally some time before the explosion of the paroxysm. BURSERIUS has seen the disease follow the formation of biliary calculi. It seems, from my own experience, to be connected more frequently with jaundice than with any other form of biliary disorder; and to possess more of the plethoric, or sub-inflammatory form, than of the nervous (§ 27, 28.).

35. (*c*) Epilepsy arising from, or associated with, *disorders of the bowels* — the *E. Enterica* of PRICHARD — more especially with *worms* in the intestines — the *E. Verminosa* of nosologists — is very common, particularly in children. It may commence in the form of convulsions, and become fully developed after several seizures; or it may be complete from the first attack, especially in the scrofulous diathesis. Although it most frequently depends upon worms, it may be connected only with an accumulation of morbid secretions, or fæcal and undigested substances, in the intestinal canal. The tape and lumbricoid worms are those which oftenest induce it; and, where this cause exists, the symptoms of worms are usually observed. When it occurs about the period of second dentition, or about that of puberty, it is often a most severe and obstinate disease. It is very frequent among the poor and ill-fed. AUTENRIETH states, that more boys than girls are affected by it. It is with difficulty distinguished from convulsions, into which it almost insensibly passes; but, according to my experience, which, especially as respects children, has been very extensive, it is not so common as the different forms of CONVULSIONS. (See that article, § 24.) MONSCHEIN (*De Epilepsia*. Franc. 1700, p. 9.) and J. FRANK consider true epilepsy from worms comparatively rare. The paroxysms, in thin and weak patients, generally commence as in the cardiac variety; or with vertigo and leipothymia, the action of the heart apparently being momentarily suspended, and the countenance pale and collapsed. In some instances, where the habit is more plethoric, the face becomes tumid, livid, or injected. The attack is often preceded by pain in the abdomen, or by nausea or vomiting; and occasionally by an aura ascending from the umbilicus. The bowels are generally constipated; but sometimes the constipation alternates with diarrhœa, the evacuations being unhealthy, crude, and offensive, and often containing little or no bile. The appetite is also craving, ravenous, and unnatural; and the skin is foul, or the seat of chronic eruptions.

36. (*d*) In these varieties, the disorders of the digestive organs may be more or less concerned in producing the disease; or both the one and the other may be coexistent, or the associated consequences of impaired vital energy, manifested in the organic nervous and vascular systems, particularly of those organs which evince most disturbance (§ 47.). In some cases, as in those related by MORGAGNI (*Epist.* ix. art. 7., et *Ep.* lxiv. art. 5.), and by Sir W. BURNETT, it is difficult to determine whether the heart, the liver, the stomach, or the bowels, present greatest functional disturbance. But, besides these, other parts concerned in the functions of digestion and assimilation may also betray disorder; as the *spleen*, *pancreas*, and *mesenteric glands*. These affections, whether they be viewed as concurrent exciting causes, or as associated effects of impaired health, are deserving of attention in practice, as their increase or diminution will very materially affect the disease; treatment being of little service, unless directed with strict reference to them.

37. *D. With disorder of the generative or urinary organs.* — (*a*) Epilepsy is most frequently either excited by, or associated with, disorder of the *female organs*, especially the *uterus* — the *Epilepsia Uterina* of EICKMEYER, GRÜGER, SAUVAGES, PRICHARD, and CHEYNE — or with irritation of the adjoining parts, as of the *ovaria*, *vulva*, &c. It may be further associated with *hysteric symptoms* — the *E. Hysterica* of WEDEL, SCHULZE, &c.; and the *E. Nervosa* of Dr. CHEYNE. But these are merely phases of the same variety; and not different species, as described by some recent writers. Uterine epilepsy sometimes proceeds from delayed, or difficult, or obstructed catamenia, and generally returns about the menstrual period. Frequently, the same causes which disorder the uterine functions, also induce this disease; as sudden alarms, terror, anxiety of mind, manustupratio, disappointed love, nostalgia, great fatigue, cold applied to the lower parts of the body, &c. This variety is most common about, or soon after, the period of puberty; and in young females of a sanguine temperament, light eyes, ruddy complexion, and plethoric habit of body; and is associated not only with difficult or suppressed menstruation, but with various symptoms of irritation of the uterine organs, or with too frequent or excessive menstruation. I have remarked that the paroxysm oftener occurs after the subsidence of the menstrual evacuation than either before it or during its continuance; and that the fit commonly commences in the leipothymiac or cardiac form. Although hysterical symptoms are observed in other varieties of the disease affecting females, yet they are most common in this, especially in nervous and delicate constitutions. These symptoms are, vertigo, faintings, palpitations, the globus or clavis hystericus; pain about the sacrum, under the left breast, or in the left side, or in either mammæ; large evacuations of pale urine; borborygmi; and occasional hysteric delirium. — (*b*) The irritation of calculi in the kidneys or urinary bladder may likewise be connected with epilepsy; but I agree with FRANK in thinking that this disorder induces convulsions more frequently than genuine epilepsy. This latter is more commonly associated with great irritability of the male organs, both affections having been brought on by masturbation; inordinate excitement, whether mental or physical, occasioning a paroxysm. There are few states of the disease which oftener present extreme fulness, or deficiency of blood than this.

38. iii. *Complicated Epilepsy* — *E. Complicata.*

— Besides the association of diseases of distant parts with epilepsy, various important *complications* of other maladies of the nervous system with it, very frequently present themselves in practice. In most cases, the complications are of the kind above noticed (§ 15, 16.)—are merely consequences of an advanced grade of the same changes upon which the epileptic paroxysms seem to depend, or these heightened by the effects of the repeated seizures. But in others, different affections of the nervous system long precede the occurrence of an attack; and in some instances the complication is manifested from the commencement; and occasionally, even the first or second seizure is of a mixed kind.

39. (*a*) The most frequent complication is that with *mania* and other forms of *mental alienation*. Much attention has been paid to this state of disease by Continental writers, particularly by Esquirol, Greding, Guislain, Frank, Calmiel, Bouchet, Casauvieilh, and Bouillaud, and by Dr. Prichard. The mental disorder generally appears in the course of prolonged cases, and at first immediately after the seizures, in an intermitting form, and as stated above (§ 15, 16.); but it is occasionally the original affection, the epileptic paroxysms supervening in the most protracted and hopeless cases of insanity, imbecility, or idiotcy. When it occurs early in epilepsy, the fits usually pass into a maniacal state of delirium, remaining longer or shorter after each, until continued and confirmed insanity is the result. This complication is sometimes congenital, and is then often connected with malformation of the cranium. It very frequently seems to depend upon chronic or sub-inflammatory vascular excitement in the encephalon, affecting chiefly the cortical and medullary structures of a part, or parts only; and is often further associated with diseases of either the *heart*, the *digestive canal*, the *biliary organs*, or the *uterine* functions, as shown by the instructive researches of Greding, Prichard, Bright, Bouchet, and Casauvieilh. — This state of disease may even ultimately pass into apoplexy or paralysis, before it terminates fatally.

40. (*b*) The *apoplectic* complication may occur as stated above (§ 16. 18.), or the very first seizure may be a combination of apoplexy with epilepsy. Of this latter, I have seen two cases within six months of writing this; — one, that of a female of middle age, attended by Mr. Byam; the other, that of a corpulent man of sixty three years. The former of these recovered, the latter died. When the apoplectic and epileptic seizures are thus associated, the distinctive features of either may precede those of the other. In the two cases now alluded to, the seizure was apoplectic at its commencement, the true epileptic convulsions not appearing until after some time; but more frequently the apoplectic phenomena supervene upon the epileptic fit. Partial or general convulsions are not infrequent in the course of an apoplectic attack. But these do not constitute the complication now being considered; for in it, the stages of the epileptic fit, as described above, with the characteristic phenomena—injury of the tongue, priapism, &c. — are clearly defined. In this kind of seizure, one or more limbs, or one half the body, may be paralysed; but as often, this additional affection is not observed. The severe forms of convulsions which occur in the puerperal states sometimes very clearly approach, or are altogether identical with, this complication. But they are rarely connected with paralysis. Notwithstanding the obvious relation between epilepsy and apoplexy, and their frequent complication, the subject has been unaccountably overlooked, even by practical writers; it having been incidentally noticed only by a few, until Dr. Bright directed attention to it (*Med. Reports*, vol. ii. pp. 198. 519.). Hippocrates (Περὶ Ἀδένων, § ix. v. 103.) seems, however, to allude to it; and his commentator, Martianus (*Annot. in Lib. Hip. de Gland.* v. 103.), Morgagni (*De Sed. et Caus. Morb.* ep. iv. sect. 4. 5. et ep. ix.), and Dr. Prichard (*On Nerv. Dis.* p. 59.) mention it somewhat more explicitly.

41. Nearly allied to this complication, especially to the slighter of those seizures which commence as apoplexy, is that form of attack mentioned by Dr. Prichard (p. 86.) as *intermediate between apoplexy and epilepsy*. In these fits, the patient falls to the ground, and lies for some time in a state of insensibility; but without any rigidity or convulsion of the muscular system. They are sometimes preceded by vertigo; and seem — at least, in the cases which I have seen — to be slight forms of those attacks which I have ascribed to sudden congestion of blood on the brain (see Brain, § 139.), probably with some degree of affection of the *medulla oblongata*. They evidently are connected with epilepsy, inasmuch as they are occasioned by the same kind of causes as produce it, and are often met with in persons at other times subject to epileptic or convulsive seizures; the one species of fit frequently passing into or superseding the other. They are often consequent upon disorder of the uterine functions, and upon hysterical affections; and they then sometimes become convulsive as the attacks subside.

42. (*c*) The complication of epilepsy with *paralysis* may appear in the same manner as the foregoing; the latter occurring either during the advanced progress of protracted cases of the former, or almost contemporaneously with it, or even long previously to it; but I believe that paralysis is most frequently consequent upon the epileptic seizures. Of this I have seen several instances; the paralytic affection consisting of loss either of sensation, or of motion, or of both, in one limb, or in half the body; and occasionally of loss of sensation in one limb, and of loss of motion in another on the opposite side. Although this association is most common after repeated seizures, yet have I met with it after the first; the paralysis either disappearing some days or weeks afterwards, and recurring after each fit, or being from the first permanent, or ultimately becoming so. In some cases the paroxysm follows the paralysis, and at last passes into coma or apoplexy. Dr. Ferriar (*Med. Hist. and Reflect.* vol. ii. p. 11.); Dr. Percival (*Essays, Med. and Experim.* vol. i. p. 148.), and Dr. Prichard (*On Nerv. Dis.* p. 60.), have recorded cases of this kind. Occasionally the paralytic state entirely supersedes the epileptic seizures; this latter disappearing, but the former being permanent. But this complication may be further associated with insanity or imbecility, or with amaurosis; and the seizure may, moreover, present a mixture of

epilepsy and paralysis, or a state intermediate between both, as remarked by PISO, MEAD, FERRIAR, PRICHARD, and myself.

43. (*d*) Of the *other complications*, little beyond the mere mention is necessary. — *Hysteria, chorea, catalepsy*, and *somnambulism*, not infrequently pass into epilepsy; and the seizures are sometimes intermediate between either of these affections and this disease. In a very large proportion of these cases, the uterine functions, or the digestive organs, are more or less disordered at the same time — such disorder proving the determining cause of the aggravated or epileptic character of the attacks. — Epilepsy may be also associated with *hypochondriasis* and *melancholy*, the digestive and biliary organs being generally remarkably disordered in these cases. I have likewise seen it alternate with *delirium tremens*, or this latter affection follow a regular paroxysm of epilepsy; and the same case, which has been thus associated, may ultimately pass, after a recurrence of the fits, into permanent mania or paralysis.*

44. V. APPEARANCES AFTER DEATH. — It has already been stated (§ 22.), that epileptic seizures may be connected with any of the organic lesions described in the articles BRAIN, and CRANIUM; but they sometimes are independent of any change cognisable to the senses. Appearances, however, vary much according as death has taken place in the fit or in the interval, and as the disease has been simple or complicated.

45. *A.* — (*a*) In the *simple states* of the disease (§ 26.), when the patient has died of some other malady unconnected with epilepsy, and has evinced no disorder of the locomotive and intellectual powers, either immediately after the fits, or during the intervals, little or no alteration can be detected in the nervous system. Occasionally, small tubercles, increased vascularity in parts, or bony deposits, and various other very slight changes, which are frequently observed without having produced any disorder of the nervous functions, are detected; but these may be viewed as coincidences rather than as lesions connected with this disease. — (*b*) When the patient dies *during the attack of simple epilepsy*, the substance and membranes of the brain and cerebellum are generally loaded and injected with dark blood, as observed in persons who have died from hanging or asphyxy. But this change is no further connected with epilepsy than being contingent on the form and mode of death in the paroxysm.

46. *B.* — (*a*) In the *complicated states* (§ 38.), especially in that with *mental disorder*, lesions of great diversity are generally found; consisting chiefly of induration of the medullary substance of the brain, frequently with more or less injection, and of considerable dilatation of the blood-vessels. In some cases accompanying the dilatation of the vessels, the medullary structure is soft, flabby, or flaccid. These alterations are generally limited in extent; but are met with in all the white portions of the encephalon. In addition to these, the grey substance often presents inequalities of surface, alterations of colour and consistence, and vascular injections — the usual results of chronic inflammation; and, in some instances, adhesions of a portion of the cortical surface to the membranes, or accumulations of serum in the ventricles. GREDING states, that of sixteen maniacal epileptics, the lateral ventricles of thirteen were filled with serum; and the brain softer than natural in nearly the same proportion of cases. In rarer instances, partial or general atrophy or hypertrophy of the brain is met with. — (*b*) In epilepsy complicated with *apoplexy*, either extreme injection of the vessels with dark blood, or the appearances presented by the different states of that disease, or great effusion of serum into the ventricles (RICHTER, MILLS, &c.), are met with. In those accompanied by *paralysis*, tumours and various other adventitious formations, cysts, softening, extravasation of blood, abscesses, and the other lesions described in the articles APOPLEXY, BRAIN, and PARALYSIS, are usually observed.

47. *C.* In the *sympathetic states*, alterations of the *medulla oblongata* and *spinal chord*, similar to those found in the encephalon, have been remarked by MORGAGNI, HARLES, FRANK, GREDING, and others. Water in the *pericardium*; enlargement and dilatation of the cavities; thinning and softening of the walls of the *heart*; and diminution of its entire bulk; have been noticed by LIEUTAUD, GREDING, and PEW. — Hepatisation and congestion of the *lungs*, and purulent collections in them, have been recorded by BONET, BAADER, and the writers just mentioned. — Enlargement and other lesions of the *liver* have been observed by PRICHARD, DR. CHEYNE, and myself. — In a case of abscess of the liver, lately under my care, and seen also by Mr. COPLAND HUTCHISON, an epileptic fit occurred at a time when the diaphragm was much affected. — Calculi in the *kidneys* have been met with by BARTHOLIN, LA MOTTE, and BRENDEL; and disease of its secreting structure, by Dr. BRIGHT.

48. *D.* The WENZELS, in their numerous dissections, directed attention to the state of the *pituitary* and *pineal glands*; but the result of their researches, until the mistake was pointed out by Dr. SIMS (*Lond. Med. Gaz.* vol. vii. p. 374.), was referred to the cerebellum, by nearly all subsequent writers, excepting ESQUIROL. These able pathologists found the *pituitary gland* and *infundibulum* variously altered in colour, consistence, size, and structure, in nearly all the cases of epilepsy they examined; and the spinous processes of the os frontis, the crista-galli of the ethmoid, and the clynoid processes of the sphenoid bone, more or less prominent, or otherwise changed in position and shape, in most of them. The *pineal gland* was also more or less altered in colour, and softer than usual, in the larger proportion of cases. — Caries, thickening, internal exostoses, spiculi, malformations, and malpositions, of the bones at the base of the skull, with various changes of the membranes, were met with in several instances. In fifteen cases out of twenty, the cerebrum and cerebellum were quite sound. Alterations in the sphenoid bone and pituitary gland have been found likewise by GREDING, NEUMANN, SIMS, and

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* I was, whilst writing this, called to a man reduced in circumstances, from habits of intoxication; and who had experienced two or more attacks of delirium tremens. He was seized with an epileptic fit, brought on by the fear of being run over by a carriage near his own house. He had a return of the delirium tremens upon recovery from the paroxysm. A gentleman, given to occasional intoxication, is at this moment under the care of Mr. CARTER and myself. He has had regular attacks of epilepsy, followed by delirium tremens. The last paroxysm has not been followed by this affection, but by threatened paralysis.

myself. GREDING has also observed changes of the pineal gland, and fibrinous concretions adhering to the inner surface of the *sinuses*, — appearances likewise noticed by WAGNER and myself. Nearly all the lesions described in § 29. *et seq.* of the article on the BRAIN *and its Membranes* have been occasionally detected, but not so frequently as the foregoing, nor so often in this as in some other diseases of the nervous system, as insanity, paralysis, &c. Indeed, the most important maladies seated in this system, as somnambulism, chorea, hysteria, catalepsy, ecstasy, convulsions, epilepsy, mania, apoplexy, and paralysis, are merely modifications, with exaltations of grade, of nearly the same pathological conditions.

49. VI. NATURE OF EPILEPSY. — There are certain circumstances connected with the pathology of epilepsy, fully ascertained, and which should be kept in recollection in our speculations as to its nature and treatment: — 1st. That it may remotely depend upon inanition, losses of blood, or a deficient quantity or quality of this fluid. — 2d. That it may be owing to a totally opposite state as respects either the system generally, or the brain especially. — 3d. That it seldom occurs in persons whose digestive, assimilating, and circulating organs perform their functions regularly — 4th. That, in the simple and early disease, it is not dependent upon any lesion cognisable by our unassisted senses, unless such lesion be seated in the *medulla oblongata* or *pituitary* and *pineal glands*, — parts not yet sufficiently examined in this malady, and which may be dangerously affected without manifesting any material change. — 5th. That the appearances found in old or complicated cases are to be referred rather to the repeated derangements the circulation of the brain has suffered in the paroxysm, and to the nature of the associated disease, than to the lesions detected in fatal cases; such lesions, however, when induced in the course of other disorders, being occasionally exciting or concurrent causes of the epileptic attacks. — 6th. That general congestion of the encephalic vessels evidently exists in the second or convulsive stage of the fit; but it is not so manifest that this state is present from the commencement of the seizure, as cases have presented, at this period, symptoms of a very opposite condition. — 7th. This congestion is only a passing phenomenon, evidently caused by interruption to the respiratory actions, impeded circulation through the heart, and to the spasmodic action of the muscular system; and is not the cause of the seizure, the principal phenomena of the fit even ceasing at the very moment when the congestion is at its height. — 8th. The paroxysms of epilepsy cannot, therefore, be imputed to the congestion, which is evidently an advanced or consecutive phenomenon produced as now stated; but must be referred to the parts on which sensibility depends, and which actuate the respiratory and muscular organs.

50. Although these positions seem not to admit of being controverted, yet there are other points necessary to a knowledge of the nature of the disease that still require to be ascertained: — (*a*) What are the states of the heart's action, and of the circulation, particularly in the head, just before and at the time of seizure? — (*b*) Is the suspension of the heart's action sometimes observed at this time, owing to a spasmodic contraction of some continuance; or to sudden loss of power; or to an interruption of the return of blood to either side of the heart? It is obvious that, until these and other points are fully ascertained, no satisfactory conclusion can be come to respecting the nature of the disease. Numerous opinions have been offered, but very few of them require any notice. The ancients supposed that the disorder is caused by a pituitous humour in the ventricles of the brain, the symptoms arising from an effort of nature to relieve herself from it. BOERHAAVE and VAN SWIETEN imputed it to a morbid action of the brain exciting the nerves of motion, and obscuring those of sensation. Dr. CULLEN considered that it may proceed in some cases from too great excitement of the brain, and in others from collapse. Numerous modern writers have referred it to a change in the structure of parts within the cranium. But opposed to this opinion, are the facts, that in the simple disease lesions are seldom observed; and that, when observed in either the simple or complicated states, they are not uniform, or even of the same kind, and are as frequently seen in other diseases of the brain, unattended by convulsions, as in epilepsy. Dr. J. JOHNSON has remarked that the immediate cause of the attack seems to be a temporary local turgescence of the cerebral vessels, determined by a temporary super-excitement of the nervous structure of the parts thus affected. This opinion is very generally adopted in connection with the inferences, that local turgescence or plethora causes pressure; and that pressure, when general, produces apoplexy; when partial, paralysis; and when slight, epileptic convulsions, — phenomena which, doubtless, frequently arise from these conditions, but not from them alone, but likewise from others; symptoms of pressure being very often altogether wanting at the commencement of the fit. — Mr. MANSFORD, proceeding on the supposition that the nervous and electro-motive fluids are identical, has contended that the brain is constantly generating them, and that, in health, they are controlled by the will, in opposition to their natural tendencies; their formation, retention, and discharge thereby being duly regulated; but, when weakened by disease, this control is irregularly or imperfectly exercised, and their accumulation is favoured, until it reaches its maximum, when it explodes in an epileptic seizure. It is obvious that this opinion is entirely founded on a postulatum — the identity of nervous influence with the electricities — to which few will subscribe. SAUVAGES had long ago ascertained by experiment that the hemispheres of the denuded brain may be punctured without exciting sensibility; but that, as soon as the instrument reaches the origin of the nerves, or the *medulla oblongata*, epileptic convulsions are produced (*Nosol. Method.* vol. i. p. 782.), and hence concluded, that whatever especially affects those parts, may induce the disease. The opinion has been adopted by several pathologists, and probably approximates as nearly to the truth as can be expected in the present state of our knowledge. — The researches of the WENZELS have led them to imagine that the proximate cause is to be referred chiefly to the pituitary and pineal glands, especially the former; and it is not improbable that impairment or other disorder of the function I have attributed at another place to these parts (see APOPLEXY,

§ 103, 104.), may be concerned in some way or other in deranging the circulation of the encephalic organs, and in predisposing, or giving rise, to the disease. Dr. REID, insisting on the suspension of the heart's action at the commencement of the fit, and on the tetanic rigidity of the muscles in the first stage of it, has referred these changes to "irritation or accumulation of blood in the spinal nervous mass," particularly the cervical portion. Dr. SHEARMAN has contended, with much justice, that simple epilepsy often owes its origin to deficiency of nervous energy, or irregular distribution of it, independently of vascular excitement or any primary disorder of the circulation.

51. It is unnecessary to offer any further opinion of the foregoing views. From a survey of the predisposing and exciting causes, and of their mode of operation, as well as of the connection frequently subsisting between other diseases and this, it seems probable, that changes in the organic nervous influence of the encephalon, or alterations of structure of any part within the cranium, may so affect those parts at the base of the brain, connected with the origin of the nerves, especially the *medulla oblongata*, as to suppress sensibility, derange the functions of respiration and circulation, and occasion inordinate action of the muscles, under the influence of the cerebro-spinal axis — in short, to disorder especially the functions depending upon these parts, in the manner constituting the disease. It may be urged that, if this affection arise from irritation or any other change in the parts now named, wherefore is it paroxysmal, or of occasional occurrence and short continuance? To this I can only answer, that nervous excitement, not depending upon or kept up by inflammatory action, is usually manifested in this form; that any other than functional affection of the parts about the origin of the nerves of respiration cannot produce the disease, as any remarkable change of structure of these parts is quickly followed by death; and that, presuming the change therefore to be functional, or at most very slightly structural, the successive phenomena constituting the different stages of the paroxysm most probably remove for a longer or shorter time, according to the duration of the interval, the particular condition which excited the attack. According to this view, irritations or other alterations of function or structure in remote but related organs or structures may affect the *medulla oblongata* or adjoining parts, so as to induce a paroxysm of the disease, especially in persons predisposed to disorder of these parts, the predisposition arising from the state of organic nervous influence and of circulation within the head. In such cases, the irritation is propagated by nervous connections to the situation referred to, the chief phenomena of the seizure being one of the numerous forms of morbid action depending upon *reflex sympathy*.*

52. VII. DIAGNOSIS.—The intimate relation subsisting between the diseases of the nervous system just alluded to, might lead to the inference that the diagnosis of epilepsy would be sometimes a matter of difficulty. But in the regular and uncomplicated form of the disease, no difficulty will be experienced. It is only when insensibility precedes the convulsions; or when there are no convulsions, or merely slight or partial convulsions; or when there is violent delirium in the paroxysm; or when there are convulsions with some degree of consciousness; or when one half the body is only affected — all which modifications may occasionally present themselves in both the simple and associated forms of the disease; — that the practitioner can doubt as to the exact nature of the attack. The intermediate seizures also between epilepsy and apoplexy (§ 41.), which frequently attack aged persons, and are, as respects the course of the affection, merely a variety of epilepsy, without the convulsions — the *Leipothymia* of SAUVAGES — may also be mistaken, especially for *apoplexy*, or for *syncope*; but, by attending to the history of the disease, in all its forms, and to the state of the pulse in the fit, its nature will become apparent. When the paroxysms exhibit the regular course described above, as they usually do, there can be no difficulty in the diagnosis.

53. (*a*) If the fit be complicated with *apoplexy*, it may be mistaken for the simple form of that malady; but convulsions will sufficiently show the mixed nature of the attack. In the *intermediate states* (§ 41.), or the paroxysms without convulsions, greater difficulty will be experienced. The nature of the seizure will, however, be evinced upon tickling the soles; for, if it be epileptic, no sensibility will be evinced, particularly in the first and second stages of the fit; whereas, in apoplexy, the patient draws away his feet, unless there be paralysis, but still one foot will retain its sensibility. Besides, this form of fit is seldom above half an hour, or an hour in duration, unless it be aggravated by improper treatment.—(*b*) *Hysteria* may be mistaken for epilepsy, particularly when the paroxysms of the former are severe; but the borborygmi and globus hystericus, the discharge of limpid urine, followed by laughing, crying, sobbing, &c. will indicate their nature. Moreover sensibility is only obscured, but never altogether lost, in hysteria, until it has assumed the epileptic character; and the convulsions come on first, even when the insensibility is greatest; the restoration of sensibility being often followed by a renewal of the convulsions, the patient at last recovering without any sopor, and with little or no fatigue.—(*c*) The *convulsions of children* are often confounded with epilepsy, although both affections are very distinct. The former are more

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* The *aura epileptica* is also, in many cases, nothing else than a manifestation of this kind of sympathy — the irritation of some internal part affecting some portion of the encephalic organs, the affection being reflected in the course of some nerve belonging to the cerebro-spinal system. In cases where this sensation may depend upon some change in the part where it originates, the paroxysm is still more evidently an expression of reflex sympathy. The reader may refer to my remarks on the *Sympathies*, in the first and second editions of my notes to M. RICHERAND'S *Physiology* (pub. 1824 and 1829), where he will find them divided into the direct and reflex — "*direct sympathy*," sympathy depending upon the organic nervous functions; "*reflex sympathy*," upon the cerebro-spinal. See, also, a paper, in the *Philosophical Transactions* for 1833, on the latter class of sympathies — the reflex, which the author has dignified by the name of "*reflex function*." The reader will then see in what this *new* "*reflex function*," of the nervous system differs from the *old* "*reflex sympathy*" of the nervous system; or whether it differs at all; also whether or not the phenomena usually designated by the term sympathetic are more correctly named by substituting for it the word function: function, in physiology, being the office any part especially performs, and not such phenomena as only accidentally or occasionally depend upon it.

continued or recurrent; are more irregular in their course; and are accompanied with more or less fever, loss of appetite, and often with thirst: whilst the latter is less frequent, more periodic, and attended by much less disorder of the digestive, circulating, and assimilating functions; the one being an *acute*, the other a *chronic*, malady.— (*d*) In fine, epileptic seizures may be readily distinguished from all others by—1st, their commencing with a scream, and sudden and complete loss of sensibility; 2d, the spastic rigidity of the affected muscles in the first stage; 3d, the convulsions being more tetanic than clonic, unless in severe cases complicated with apoplexy; 4th, the foaming at the mouth, distorsion of the features, and lividity of the countenance; 5th, the priapism and unconscious discharges; 6th, the injury sustained by the tongue; and 7th, the consequent sopor, or mental aberration. The diagnosis of real from *feigned* epilepsy is considered in the article on FEIGNING DISEASE.

54. VIII. PROGNOSIS.—An opinion of the disease should have reference—1st, to the recurrence of the paroxysms; 2d, to their severity, duration, and the danger to be apprehended; and, 3d, to the nature of the disorder complicated with them. Of epilepsy generally it may said, even when the simple form, and not very frequent recurrence, of the fits indicate no immediate danger, that few disorders are more intractable, or more liable to contingent complications of a very serious kind. The danger varies materially in the different *varieties* and *states* of the disease, and increases as the fits return more frequently, as they become more severe or of longer duration, and as additional disorder of the nervous system associates itself with them.—(*a*) In the *simple* forms, the cerebral symptoms, preceding and following the fits, are the chief guides in forming a prognosis; but what is known of the causes must also be taken into account. The presence of intense pain, vigilance, delirium, mania, amaurosis, paralytic symptoms, &c., either before or after the seizure, indicate organic lesions of the brain, and an unfavourable form of the disease, usually passing into some one of the complications described above. In cases of this kind, considerable danger is to be apprehended from the paroxysm, especially when there is evident plethora. Hereditary predisposition, severe injuries of the head, and the scrofulous diathesis, although not necessarily indicating immediate danger, are also very unfavourable circumstances.

55. (*b*) The *sympathetic states*, or those associated with or arising from disease in related organs, are generally less dangerous than the cerebral varieties. Of these forms, the most serious are the *spinal* and *cardiac;* and the least so, the *uterine*, *enteric*, and *stomachic* or *dyspeptic*, but much will depend upon the amount of disorder in the respective organs, and the habits of the patient, particularly as to indulgence of the appetites. When these are under due control, the latter three varieties often terminate favourably. The *uterine* variety sometimes disappears after marriage; but if an attack occurs in the puerperal states, it is attended by much danger.

56. (*c*) The *complicated varieties* present few chances of complete recovery, especially the *paralytic* and the *insane*. When, however, the paralytic symptoms are slight, or pass away soon after the fit, recovery should not be despaired of; and the same may be said of the form attended by temporary delirium, or by *delirium tremens*, or by temporary *mania*, or intermitting insanity. M. ESQUIROL states, that epilepsy complicated with continued insanity is never cured. I have seen complete recovery from the *apoplectic* variety; but this is a complication also of great, and often immediate, danger. The *intermediate* form is much less dangerous.

57. (*d*) The fits usually *recur* most frequently in the cerebral and complicated forms; and next in the spinal and cardiac. They are most rare in the uterine, and the nephritic, and in the gastric and hepatic. Dr. CHEYNE thinks that the disease is most inveterate, when it is accompanied with chronic cutaneous affections. Addiction to masturbation aggravates and prolongs it, and often causes it to pass into the paralytic and maniacal or insane complications; but, when it has arisen from this most baneful and disgusting practice, and the patient has had resolution enough entirely to relinquish it, a complete cure will often be accomplished. Epileptic seizures from the metastasis of gout or rheumatism, or in persons of the gouty or rheumatic diathesis, may not return, if these diseases fix themselves in the extremities. When the fits arise from the syphilitic infection, a mercurial course will generally remove them permanently. M. CULLERIER has recorded several instances of this.

58. IX. TREATMENT.—i. *Of the Paroxysm.*— The *intention* is to shorten the fit, or render it less severe: but this is not easily accomplished; and the means usually recommended for the purpose, if inappropriately used, may have a very opposite effect; and either render the next seizure more severe, and the interval shorter; or convert what would have been a simple, and by no means serious, paroxysm into a recurring and prolonged seizure, followed by various unfavourable symptoms.—*Bleeding* has been advised in the paroxysm; but, unless in the epilectic convulsions of the puerperal states, or when the fits are attended by very marked plethora, or cerebral congestion, or in a first attack, especially when consequent upon the suppression of some sanguineous evacuation, it should be deferred. Besides, it cannot easily be performed in the convulsive stage of the paroxysm, at which time it is most appropriate. In the just mentioned excepted circumstances, however, I have directed it with great advantage. But in the soporose period of the fit, it should not be resorted to, unless apoplectic symptoms be present. I have seen it, at this stage, cause a return of the paroxysm as soon as sensibility had been partially restored.*

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* A gentleman, residing near Portman Square, had been under my care, in the spring of 1833, for articular rheumatism. He soon recovered, and went out of town. Towards the close of the year, whilst in Scotland, he had an epileptic attack; and was blooded in the arm, and cupped soon afterwards. This was the second seizure, the first having occurred two or three years before. He returned to town immediately after this second attack; and, when I saw him, there appeared no occasion for further vascular depletion: a course of alteratives and stomachic purgatives was therefore directed. Three or four days afterwards, he had a third seizure, and was brought home in the soporose stage of the fit. I did not see him until about two hours afterwards; and then a physician, who had been called in whilst I was sent for, had had him cupped largely! But, soon after the depletion, and as sensibility was returning, the paroxysm

— The *cold affusion* on the head and occiput is sometimes useful, particularly where there is much heat of the head, and when the disease has been consequent upon or connected with hysteria, or associated with uterine disorder; but in other circumstances I have not seen so much advantage from it as I had anticipated. Brera (*Giorn. di Med. Prat.* t. iii. c. 3.), however, speaks of it very favourably. It requires, however, discrimination as to the time and manner of employing it; for it may be even injurious, if resorted to in the soporose stage, or continued too long, especially when the head is cool, and the pulsation of the carotids is weak: in these, the *tepid* or *warm affusion* is much more appropriate. — *Antispasmodic and purgative enemata* are, upon the whole, as safe and efficacious means as can be employed in the fit. When there is but little determination to the head, the assafœtida injection, with or without a small quantity of camphor, and some castor oil, may be preferred. But when this symptom is present, the terebinthinated enema (F. 150.) is more efficient. In some cases it will be advisable to combine these substances, or to add others.

59. Under every circumstance, all ligatures and cinctures should be instantly removed; and the patient placed in bed, in a large and very airy apartment, with the head and shoulders much elevated. A cork or wedge-shaped piece of soft wood ought to be introduced between the teeth, and the struggles gently but not forcibly restrained, so as to prevent the patient from injuring himself by their violence. Certain popular remedies have been noticed by writers. Dr. F. Hawkins thinks that filling the patient's mouth with common salt is not without use; and J. Frank entertains a similar opinion of placing a piece of cold metal in the hands. I have seen apparent benefit from a similar application to the nape of the neck and occiput; and probably ice, or the cold affusion, in this situation, would be equally useful. Upon the whole, excepting the precautions recommended above, it will be as well to adopt the advice of Celsus, and to do but little in the paroxysm, unless under the circumstances now stated. Where the fits are moderate and uncomplicated, and especially when the practitioner is either in doubt, or insufficiently informed as to the state or variety of the disease, this is certainly the safest plan; for in the simple forms of epilepsy, I have seen more harm than advantage from the "*nimia diligentia medici*" during the paroxysm.

60. ii. *Treatment in the Intervals.* — Upon visiting an epileptic patient, the physician should enquire into his general health, disposition, avocations, habits, modes of living, and former attacks of this or of other diseases; and ascertain the causes of the first seizure. The information thus obtained, viewed in connection with his present state, will generally enable the physician to ascertain the following things, which are of the utmost practical importance: — (*a*) The existence of plethora, of asthenia, or of inanition, and the probable extent of either, in the *simple*, the *sympathetic*, and *complicated forms* of the malady; — (*b*) The states of the digestive, assimilating, circulating, depurative, and generative functions, and of the organs chiefly concerned in them — or the *sympathetic* forms of the disease; — (*c*) The existence of other disorders of the nervous system, and especially with reference to chronic inflammation, or its effects in parts within the cranium — or the *complicated* states; — (*d*) The evidence of impending or of more remote danger. Having thus analysed the case, the particular *variety* to which it should be referred will be determined with greater ease. Proceeding thus, in order to the due appropriation of the means of cure, the physician should direct them calmly and decidedly, with reference to the disposition, the feelings, the weaknesses, and the irresolution of the patient; and in a manner calculated to gain his confidence, and to inspire hope. In this, as well as in all nervous diseases, the communications of the physician should be brief, clear, and forcible, without descending to any explanation whatever, either as to the cause or intimate nature of the disease, and the operation of the remedies he recommends, or as to his reasons for adopting them in preference to others; for these are matters respecting which no one but a well-educated medical man can think aright, or should even attempt to think. All endeavours to explain abstract matters connected with disease, and the means of removing it, to unprofessional persons, however well informed they may be, is to place ourselves at the mercy of the pragmatical objector or self-sufficient volunteer in the professed cause of humanity. That ignorant empirics are sometimes apparently more successful in the cure of nervous diseases, than scientific practitioners, chiefly arises from the circumstance of the former being incapable of stating their views, or assigning reasons for their procedures; whilst the latter, as justly remarked by Dr. Cheyne, are generally very much too ready, as respects both their own reputation, and the confidence of their patients, to explain every thing. The empiric is fully convinced of the justice of the apothegm — "*Omne ignotum pro magnifico,*" — and acts conformably with it:

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recurred. The obvious course in this case was, to have caused the patient to be removed to bed, and to have stated that nothing further was requisite in that stage of the fit until the patient had partly slept off the exhaustion; when the physician in attendance would pursue that course which his knowledge of the antecedent disorders and state of the patient would warrant.

Whilst this was passing through the press, a man of middle size, apparently about forty, consulted me; and stated that he had been seized with the first paroxysm of the disease immediately post coïtum quinquies repetitum duabus cum puellis inter horas perpaucas; that he had been blooded to about a pint soon afterwards, and experienced a still more severe fit about a month after the first; that the third seizure occurred about a fortnight after the second, during which he fell down and cut his head, the cut part having bled a pint at least; that his usual medical attendant, upon arriving soon after the termination of this fit, bled him largely from the arm; but that, as soon as the vein was closed, the fit recurred; and that, during the struggles, the vein broke out, and the blood was allowed to flow until two or three pints were taken in addition to the quantities lost just before. The person who accompanied him to my house, on account of his weak state, and who witnessed the paroxysms, stated that this last was most severe; and that the fit which recurred during the depletion, and which was attempted to be put a stop to by continuing the abstraction of blood until a very unusual quantity was lost (about five pints in all), was remarkably prolonged and violent. The patient is now pale and weak, with a waxy appearance of the surface; completely exhausted, physically and mentally; and constantly dreading a recurrence of the paroxysms. This case furnishes a very remarkable instance, not only of the failure of large blood-letting in arresting or shortening the fits, but also of its influence in rendering them more frequent and violent, when injudiciously prescribed.

the man of science is candid, and ready to impart to others the views he entertains. The silence of the one, although generally the cloak of ignorance, imposes more on the public than the open deductions of the other, however confirmed by science and enlightened experience.

61. iii. *Treatment of Simple Cerebral Epilepsy.* — *A.* This form of the disease, depending upon *deficient power*, and *inanition* (§ 27.), being occasioned chiefly by exhausting discharges, vicious habits, or imperfect nutrition, obviously requires the removal of these causes, and means to invigorate the nervous system, and equalise the circulation, which, even when the blood is most deficient in quantity, is generally inordinately determined to particular organs, and especially to the brain, during the convulsive stage of the fit. In this and the other form (§ 63.) of the cerebral disease, the moral means just hinted at are especially required, with the regimen hereafter to be described; and, whilst the mind is confirmed thereby, these intentions may be simultaneously fulfilled. With this view, a light and nutritious diet, in very moderate quantity, and chiefly farinaceous, may be allowed; and the preparations of *iron* exhibited in conjunction with bitter tonics, or stomachic laxatives. The feet should be kept warm, and the head cool, whilst the circulation on the surface is promoted by daily shampooing, or by frictions with coarse flannels or the flesh-brush. If there be occasional flushes, or increased heat of the scalp, the hair should be cut close, and the head sponged night and morning, or even oftener, with a cold acetous lotion. Moxas or blisters may be applied behind the ears, and repeated from time to time, or a seton inserted in the nape of the neck. In some cases, the latter may be found too irritating or exhausting; but, even in these, it may be of service, if the rest of the treatment and regimen be sufficiently invigorating; and the digestive and assimilative functions be judiciously promoted. As amendment proceeds, the cold sponging of the scalp may be replaced by the daily use, in the morning, of the shower bath.

62. Where we have reason to suspect that the disease has been induced by venereal excesses, the subcarbonate of soda may be given with tonics, and soda water taken as a common beverage: but neither of these ought to be continued too long. In the scrofulous diathesis, and where we suspect organic change, BRANDISH's alkaline solution may be prescribed, in any of the bitter infusions; or a solution of the ioduret of iron, or of the hydriodate of potash. In a case very recently under my care, three grains of blue pill, with seven of the aloes and myrrh pill, were given on alternate nights, and one of the above preparations of iodine during the day, with very remarkable advantage. When the functions of the liver are impaired, as occasionally happens, small but frequent doses of the preparations of mercury, with taraxacum, taking care not to affect the mouth, will be of service. I have found them, however, often fail of improving the excretions, until tonics were also exhibited. In a case of this kind, I prescribed very small doses of the oxymuriate with the compound tincture of bark, and the preparations of sarsaparilla, with great benefit. Equal proportions of the nitric and muriatic acids, thrice daily, or oftener, or the addition of them to the warm foot-bath, may also be useful. — When the disease proceeds from excessive sexual indulgences, late hours, and addiction to intoxicating liquors — a combination of causes by no means infrequently inducing it — the alkaline carbonates, or the liquor potassæ with the infusion of valerian, or bitter tonics; or very small doses of camphor with the oxide of zinc, and cinchona, or the tincture of the muriate of iron in the infusion of quassia, may be employed. In this, as well as in the other varieties of the disease, when depletions and depressing agents have been carried too far, the preparations of iodine, or the extract of nux vomica, or strychnine, or other tonic and antispasmodic remedies hereafter to be noticed, may be prescribed, in forms of combinations which the peculiarities of the case will suggest..

63. *B. Simple cerebral epilepsy, connected with plethora or excited action* in the head, is the most common form of this variety, in this country; and requires, according to the apparent degree of either of these pathological states, *bloodletting*, general or local, or both; and, subsequently, the affusion of cold water on, or cold sponging, the head, or the shower bath; derivatives, particularly setons, moxas, or issues, or blisters behind both ears, kept open some time, or often repeated; and purgatives every second or third night, with low diet, and total abstinence from all spirituous and fermented liquors. Unless plethora or vascular action be very considerable, local bloodletting once a month, in moderate or small quantity, is preferable to large depletions; and, if the fits recur monthly, the patient may be cupped just before the new or full moon, according to the period at which the fits recur. Dry cupping over the nucha and between the shoulders may likewise be practised once or twice, or even oftener, between the bleedings, as judiciously advised by Dr. CHEYNE. An issue or seton near the nape of the neck, or an open blister, is more serviceable in this than in the preceding form of cerebral epilepsy. Where there is manifest determination to, or increased vascular action in, the brain, antimonials, and especially James's powders, are often beneficial. Dr. CHEYNE (*Dub. Hosp. Rep.* vol. i. p. 315.) recommends this powder to be taken at bedtime, commencing with two or three grains, and increasing the dose by half a grain each night, until a sensible effect is produced on the skin, stomach, or bowels. If it occasion sickness, the dose should be diminished one grain on the following night. He states that, by adding a few grains of rhubarb to it, a larger quantity of the James's powder will be borne by the stomach than could otherwise be taken. If it produce diaphoresis, the same dose may be continued for three weeks, and then it should be reduced half a grain each night; the course of this medicine thus usually extending to six weeks. In this manner the dose may be increased to fifteen or twenty grains, and continued for some weeks, without offending the stomach. When we suspect the existence of a state of chronic inflammatory action, the *antimonial liniment* (F. 301.) or *ointment* (F. 749.), may be rubbed along the spine, or over the nape of the neck and occiput; the latter application being continued until a copious eruption of pustules is procured, which should be kept out for some time.

64. Although *cerebral* or simple epilepsy frequently appears connected with one or other of the states of vascular fulness and action above specified, yet cases will also often occur in which the practitioner will be at a loss to determine the presence of either; the disease being dependent upon deficient nervous power, with irregular circulation or distribution of blood, rather than upon any deficiency or excess of this fluid. In these cases, the vital nervous system is primarily and chiefly in fault; congestion or irritation possibly also existing in the medulla oblongata or adjoining parts of the encephalon. But little advantage can be expected in such from depletions only, especially when pushed far, as they will increase these morbid states, and even favour determination of blood to the head. I believe that most advantage will accrue *from such remedies as will promote an equable and free action of all the excreting organs, and impart tone to the nervous system.* Light diet and very moderate use of animal food; total abstinence from fermented and spirituous liquors; careful avoidance of the predisposing and exciting causes, and particularly of those in which the case originated; regular exercise in the open air, taken often, and short of fatigue; travelling, or frequent change of air; a due regulation or moderation of all the passions and appetites; the daily use of the shower bath; external irritation or derivation; and anti-epileptic tonics and antispasmodics; or moderate local depletions, or dry cupping, or both, as circumstances may indicate; are the most rational resources. When the case evinces an inclination to one or other of the states above considered, the treatment pointed out with reference to it should be enforced to an extent co-ordinate with the amount of such disorder. If there be any tendency to plethora or excited action, animal food should be altogether relinquished, — a measure advised also by FOTHERGILL, HEBERDEN, FRANK, ABERCROMBIE, and CHEYNE.

65. iv. *Treatment of the Sympathetic Varieties.* — *A. From Disease of the Spinal Chord or Nerves* (§ 30, 31.). — This variety will necessarily require either vascular depletions, or tonics, or even both, according to the degree in which plethora, increased action, or deficient power, is inferred to be present. — (*a*) Where increased fulness or action exists, cupping, the application of leeches, and dry-cupping in the course of the spine, the insertion of setons or issues a little below the seat of pain, frictions with the mercurial and compound camphor liniments, or the repeated application of moxas, are the most efficient means, aided by purgatives, the usual antiphlogistic remedies, and by rest. — (*b*) Increased vascular action in the spinal chord, or its surrounding parts, is, however, often associated with deficient power, and sometimes even with inanition. In such cases, whilst moderate local depletion, dry cupping, external derivation, &c. are resorted to, the more antispasmodic tonics, as valerian, myrrh, castor, &c., and even the preparations of iron, cinchona, camphor, ammonia, &c., should be prescribed. — (*c*) This state of disease is not infrequently induced by masturbation. In this case, cold aspersion of the genitals, night and morning; sponging the spine with cold salt water, or with vinegar and water; or the effusion or aspersion of these along the back; and the internal use of the muriated tincture of iron, or of the carbonate of iron with soda, or of BRANDISH's alkaline solution in tonic infusions; will prove of the greatest benefit. Due regulation of all the secretions and excretions; early rising; and, as the strength increases, a shower bath every morning; will also be powerful adjuvants. When cold sponging, &c. are not resorted to, tonic plasters (F. 111. 117, 118.) may be applied along the spine. — (*d*) If pressure from the effusion of lymph, or serum, or from the thickening of some portion of the sheath of the cord, be inferred after a careful examination, the preparations of iodine may be tried both internally and externally, particularly the hydriodate of potash, or the ioduret of mercury; or the linimentum hydrargyri and the linimentum terebinthinæ may be rubbed along the spine night and morning. — (*e*) If the fits be preceded by an *aura*, a ligature should be instantly applied above the place at which it commences, if this be practicable; or a seton or issue inserted in the part, and kept freely discharging; or a blister applied before the expected return of the paroxysm, and either preserved open, or often repeated. — (*f*) Sometimes this variety is connected with uterine irritation or disorder; it being almost impossible to determine whether the spinal or the uterine affection is primary, or which of them is most instrumental in causing the epileptic seizures. Cases of this kind are met with chiefly in large or manufacturing towns, and in females who have become addicted to sexual excitement; and appear to me to be most benefited by counter-irritation in the course of the spine; by the application of an antispasmodic liniment (F. 297. 311.) in this situation; and by the alkaline carbonates, or BRANDISH's solution with hyoscyamus, in tonic infusions or decoctions. Subsequently, the remedies enumerated above (*c*) may be prescribed.

66. *B. With especial Disorder of the Heart or Lungs* (§ 32.). — It is by no means easy to determine what is the most appropriate and successful treatment in these states of the disease. Local depletions, antispasmodic tonics, or chalybeates, according as the case may present excess or deficiency of blood, aided by purgatives or laxatives, and regulated diet, are generally required. External derivation, chiefly by means of one or two setons or issues, should not be omitted. It has been supposed that the circumstances especially indicating the propriety of resorting to setons or issues, contra-indicate the exhibition of tonics. But such is certainly not generally, nor even frequently, the case in this disease. I believe that, in many instances in which these external means fail of affording relief, the failure has been partly owing to their having been employed, either at a time when the system has been too far reduced by depletions; or in conjunction with those and other depressing agents, in cases wherein such treatment was inappropriate, or carried too far. Where the function, or even the organisation, of the heart is affected in epilepsy, it will be found that greater benefit will accrue from a judicious exhibition of tonics and antispasmodics, aided by external derivation, than from other remedies. In many cases, the disorder near the centre of the circulation depends either upon deficient or irregularly distributed nervous power, or upon some affection of the medulla oblongata,

and is merely a varied manifestation of the primary form of the disease. In these, the treatment already advised for that form, according to the states of vascular fulness and action, will be appropriate. Where signs of pulmonary congestion or inflammation appear after repeated seizures, vascular depletions, external derivation, and low diet, must be chiefly depended upon. When the fits are preceded by a feeling or any other symptom of cardiac disturbance, an antispasmodic medicine should be in readiness for the patient to resort to. The following have been recommended; and either of them, or F. 423. or 424. may be taken, in any of the forms of the disease, when premonition of the fit is felt.

No. 210. ℞ Aquæ Ammon. Sub-carbon. ℥ j.; Tinct. Succini ʒ iij.; Tinct. Castorei, Tinct. Assæfœtidæ, āā ʒ vjss. Capiat æger cochleare unum minimum, vel duo, in aquæ cyatho. (De Haen.)

No. 211. ℞ Fol. Recent. Lauri-Cerasi ʒ vij.; tere cum Sacchari Albi ʒ xiv.; Pulv. Fol. Aurantii ℥ j.; Syrup. Rosarum et Syrup. Violar. āā ℥ ij. Fiat Electuarium, cujus capiat cochleare unum medium ante paroxysmi accessionem. (Van Mons.)

No. 212. ℞ Spirit. Ammoniæ Succinati ʒ iij.; Tinct. Castorei, Tinct. Valerianæ, āā ʒ ijss.; Mist. Camphoræ ℥ vij. M. Capiat coch. ij. vel iij. magna, adveniente paroxysmo.

67. C. *With Disorder of the Digestive Organs.* — (*a*) In the *gastric* association, it may often be requisite to commence with an emetic, consisting chiefly of the sulphate of zinc. But the frequent repetition of it is very rarely of the least advantage. Although the appetite is often ravenous, yet digestion is slow and imperfect, and needs the aid of tonics associated with laxatives. The compound galbanum pill may be given through the day, conjoined with equal quantities of inspissated ox-gall and Castile soap, or with the extract of gentian and quinine; and, when the bowels are sluggish, three or four grains of the gall may be taken on alternate nights with an equal quantity of aloes. If the biliary secretion be deficient, a full dose of calomel once a week, followed by a purgative draught (F. 181, 182.), will be requisite. If there be deficient action, or fulness, of the vascular system, or general asthenia, the mistura ferri composita, or the mistura ferri aromatica (*Dublin Pharmacop.*), may be exhibited; or the sulphate of iron, or of zinc, or of copper, or of quinine, may be prescribed with some tonic or antispasmodic extract, or with the compound galbanum pill. In cases evincing great depression of nervous power, with deficient tone of the vascular and muscular systems, these latter remedies, or the ammoniaret of copper, the extract of nux vomica, or strychnine, or the nitrate of silver, may also be tried, and in similar forms of prescription. It is in this variety that travelling, and change of air, of domicile, or of habits, as advised by De Haen, is most likely to be of service, as Dr. Cheyne remarks. In many cases, it will be necessary to assist the digestive organs, either shortly before, at the time of, or soon after, a full meal. With this view, the aloes and myrrh pill, or aloes with mastich, or with the addition of capsicum, has been generally recommended. Either of the digestive pills in the Appendix (F. 558. *et seq.*) may be directed in this manner. The ox-gall with extract of gentian, or of hop, and a grain or two of aloes, is the most beneficial; a small portion of the aloes acting fully on the bowels, when combined with these bitter tonics, or with the sulphate of quinine. These will seldom or never fail of preserving the bowels very freely open; but if irritation in the rectum be excited by them, they may be relinquished for a time, and injections substituted; or they may be prescribed, in a more purgative form, every second or third night.

68. (*b*) Cases manifesting *hepatic* disorder (§ 34.) should be treated with reference to the nature of that disorder. If symptoms of excited action be present, general or local depletions, antimonials and cooling diaphoretics, and a seton or issue near the region of the liver, will be necessary. If there be enlargement, chronic obstruction, torpor, or accumulation of bile in the ducts, deobstruent purgatives, especially the preparations of mercury, the taraxacum in large doses, and subsequently a course of alteratives (see especially F. 503—511.); the repeated application of blisters over the hypochondrium; and the dilute nitro-muriatic acid, internally or externally, or both; will be productive of more or less benefit. As, in these cases, the functions of both the stomach and intestines are also impaired, these means should be conjoined with so much of the treatment directed with reference to disorder of these organs (§ 67. 69.) as the peculiarities of the case may warrant.

69. (*c*) *Epilepsy from worms or other disorders of the intestines* (§ 35.) should at once be treated by the purgative anthelmintics; for, even where no worms may exist, these medicines frequently remove morbid matters which have accumulated in the prima via in this variety. Having expelled these sources of irritation, antispasmodic tonics — especially valerian, assafœtida, camphor, galbanum, the preparations of iron, &c. — will generally be of great service, in preventing both a recurrence of the paroxysms and the regeneration of worms. It is in this variety that an occasional full dose of the oil of turpentine, either with castor oil, or followed, in two or three hours, by this or some other purgative, is most beneficial. A full dose of calomel should also sometimes precede the exhibition of the turpentine; and their action may be further assisted by enemata with equal quantities of these oils. When the symptoms described towards the conclusion of paragraph 35. are present, purgatives and purgative enemata every second and third day; and tonics or chalybeates, with warm cardiacs and antispasmodics, should be prescribed for a considerable period. Frictions of the surface, particularly of the abdomen, loins, and thighs, ought also to be employed daily, occasionally aided by warm embrocations or liniments. Subsequently, the shower bath may be directed, and steadily persevered in, with such other of the remedies already recommended as the circumstances of the case may require. Where associated disorder of the *spleen*, *pancreas*, or *mesenteric glands* is present (§ 36.), purgatives, deobstruents, and tonics, variously combined, and the preparations of iodine, with external derivation, are chiefly to be relied upon. In this variety, the following stomachic purgatives, taken alternately, at bedtime, will frequently be very serviceable: —

No. 213. ℞ Pilul. Hydrarg. (vel Hydrarg. cum Cretâ), Pil. Galban. Comp., Extr. Colocynth. Comp., āā gr. iv.; Fellis Bovini inspissati gr. ij. M. Fiant Pilulæ iij. pro dosi.

No. 214. ℞ Sodæ Sub-carbon. ℈ j.; Sodæ Sulph. ʒ ss.—ʒ j.; Infus. Sennæ, Infus. Calumbæ, Aquæ Pimentæ, āā ʒ v.; Tinct. Cardamom. Comp. ʒ j. M. Fiat Haustus.

70. *D. From Disorder of the Generative and Urinary Organs.* — The *causes* (§ 37.) of this variety should be ascertained and removed, otherwise medicine will be of little service. The treatment should depend chiefly upon the degree of vascular fulness and action, in connection with the state of nervous power. When it has arisen from suppressed catamenia, or from amenorrhœa, without any chlorotic appearance, bloodletting may be safely prescribed and repeated; and the usual means of restoring this evacuation resorted to. But when the fits appear before the catamenia are established, the period of puberty having arrived, blood-letting must be more cautiously employed, unless there be evident plethora, when it may be prescribed much more freely; and it should be aided by such emmenagogues and purgatives as the habit of body, diathesis, and strength of the patient will warrant. If the disease be attended by signs of irritation of the uterus or ovaria, or by hysterical symptoms (§ 37.), heating and stimulating emmenagogues and antispasmodics should be laid aside, and those of a cooling and sedative kind prescribed, such as nitre with the subcarbonate of soda or of potash, with hyoscyamus or the preparations of hop. When the fits follow the subsidence of regular and free uterine evacuations, vascular depletion is very seldom beneficial; the antispasmodic tonics, as valerian, the ammoniated tincture of valerian, assafœtida, the metallic sulphates, &c., occasional purgatives, and strict attention to the digestive functions, being much more appropriate. If the fits be connected with dysmenorrhœa, or scanty menstruation, vascular depletions, especially from the feet immersed in warm water, are generally of service, when the habit is full or the strength unimpaired. After the necessary evacuations, large doses of camphor combined with opium or hyoscyamus, also in large quantities, will generally relieve the more urgent symptoms. This practice has been pursued by me for several years, and has very recently been recommended by Dr. Cheyne. Semicupium, or the hip-bath, the internal use of the sub-borate of soda, and frictions of the lumbar region, abdomen, hips, and thighs, night and morning and after coming out of the bath, by a hard flesh-brush, or by flannel, will also be useful adjuvants. If the attacks occur about the commencement of the menstrual period, the application of a number of leeches near the groins, or on the insides of the thighs, shortly before the expected time, will often render the attacks more and more slight, and increase the discharge. Setons or issues in the latter situation will sometimes have a similar effect. If the catamenia be too abundant, or too frequent, or if symptoms of inanition or asthenia be manifest, the invigorating measures already advised ought not to be neglected. The connection of this form of the disease with manustupratio, or with great irritability of the sexual organs, should be kept in recollection; and where either the one or the other is detected, or even suspected, a strict mental and moral discipline, with the means recommended above (§ 62.), ought to be instituted. An occasional full dose of turpentine, either conjoined with some other purgative, or preceded by a dose of calomel, or followed by a brisk cathartic, and turpentine enemata, are sometimes of great service, particularly when the fits proceed from suppressed, obstructed, or difficult menstruation. Dr. Prichard advises the turpentine, in this state of the disease, to be given in an emulsion, in doses of from half a drachm to two drachms three times a day, or two drachms every night; but in this mode of exhibition it is generally nauseated, and is often productive of disagreeable effects, unless it be conjoined with some other purgative. If the fits be connected with disease of the *urinary organs* (§ 37. *b.*), the alkaline carbonates, with hyoscyamus; and oily purgatives, or other remedies suited to the disorder of these organs; will often prevent or relieve them.

71. v. *Treatment of Complicated Epilepsy.* — The complicated states, being evidently, in a large majority of cases, caused by advanced grades of the same pathological conditions as produced at first the simple epileptic paroxysms (§ 28. 51.), generally demand similar measures to those directed in the cerebral forms, but in a more energetic and persevering manner, especially when occurring early in the disease, and in young or robust persons. — *A.* The *complication with mania* or *insanity* will require, according to the history, the stage, and the existing circumstances, of the case, either copious depletions and evacuations, or an invigorating treatment, conformably with the principles already stated. Chronic inflammation of the brain or of its membranes should always be dreaded in this unfavourable form of the disease; and wherever the state of the circulation, and the symptoms referrible to the head and organs of sense, especially the pulse in the carotid, and the temperature of the scalp, evince its existence, general or local bleeding; the cold affusion on, and sponging, the head; purgatives; mercurials with antimonials, particularly calomel and James's powder; external derivation; irritating liniments, setons, or issues, &c.; should be employed, according to the habit of body and degree of vascular action and vital power. When the complication is of a *maniacal* kind, and vital power is not much impaired, these means may generally be energetically prescribed; repeated local depletions, the spirits of turpentine in purgative doses, and calomel with antimony pushed so far as to affect the mouth, being often of great service, especially if it occur in young robust persons, or from the suppression or disappearance of some other disorder, or of accustomed evacuations. But when the mental disturbance has slowly supervened, or attended an asthenic state of the disease (§ 27.); or has arisen from causes productive of exhaustion or inanition, consisting more or less of the low forms of *insanity*, or of mental weakness; the treatment advised with reference to the nervous or asthenic form of cerebral epilepsy (§ 61, 62.) must be pursued; external derivatives, and free alvine evacuations, being also directed. In this complication, the functions of the heart, digestive canal, liver, and uterine organs, should be duly regulated, as already recommended in the sympathetic varieties, whenever they present any manifest disorder.

72. *B.* The *apoplectic complication* (§ 40.) must be treated conformably with the principles explained in the article Apoplexy. But my experience enables me to state that bloodletting can seldom be safely carried so far in it as in true apoplexy; and that cupping on the nape of the

neck, leeches behind the ears and to the temples, purgatives frequently repeated, brisk cathartic enemata, and external derivatives, are chiefly to be confided in. After recovery from the seizure, the measures appropriate to the habit of body and other circumstances of the case, as described with reference to the sanguineous form of cerebral epilepsy (§ 63.), should be resorted to. The *intermediate states* between apoplexy and epilepsy (§ 41.) will require local depletion, alvine evacuations, and restorative medicines, according to the evidence furnished of vascular fulness, or of vital and nervous depression. In the intervals, stomachic purgatives, and antispasmodic tonics, with regulated diet, change of air, &c., will generally be necessary. When these states are connected with disorder of the uterine functions, the measures directed in the uterine form of epilepsy should be prescribed.

73. *C.* The *complication with paralysis* (§ 42.) will seldom be treated with any success, unless the palsy be partial, and pass off soon after the fit; when we may infer that it has been owing to the congestion attending the convulsion. When the patient is young, of a full habit, or of unimpaired powers, *bloodletting*, general or *local*, or repetitions of the latter, will be requisite; aided by purgatives, setons, and the other means advised in the apoplectic complication. But in persons presenting evidence of asthenia or inanition, the preparations of *iodine*, especially the hydriodate of potash, and ioduret of iron; the extract of *nux vomica* with aloes, or the aloes and myrrh pill, or *strychnine*, in any of the forms given in the Appendix (F. 542. 665. 907.); and the metallic sulphates, with the antispasmodic tonics, especially valerian, serpentaria, assafœtida, camphor, ammonia, &c.; will be most beneficial. But, even in these cases, purgatives should not be neglected; such as are of a warm stomachic kind being selected, and exhibited regularly every second or third day, so as fully to evacuate the bowels. In the more sthenic states of this variety, complete recovery from the paralytic symptoms is sometimes witnessed after free evacuations; but the patient is not secure from a return of the paroxysm in some one of its most dangerous states of complication, although his health may appear quite re-established. In a case to which I was lately called, these symptoms disappeared after full bleeding from the arm, copious purging, &c.; and the patient was able to pursue his occupation, and expressed himself quite well: but in a few days he was seized with another fit, of which he died in a few minutes. The bloodletting which I directed in this case was large; but the habit of the patient, the state of the pulse and of the blood drawn, and the effect produced by it, indicated the propriety of having recourse to it in a decided manner.

74. *D.* Of the *other complications* (§ 43.) of this malady, little further need be adduced. They require more especially a persevering use of stomachic and deobstruent purgatives, with antispasmodics, external derivatives, and due attention to diet and regimen, varied and associated with other means according to the particular nature of the complication, or sympathetic disorder, and the habit of body and other circumstances of the case.

75. vi. *Remarks on the Remedies and Means of Cure recommended by Authors, with reference to the Varieties and Circumstances in which they are most appropriate.* — *A. Bloodletting*, general and local, has been recommended by most writers; but the extent to which it may be carried has rarely been understood, and never attempted to be assigned. At the present day, it is more frequently carried too far than neglected when it ought to be directed. Of modern writers, Dr. CULLEN and Dr. BRIGHT have estimated it in a manner which approaches the nearest to the results of my own experience. If carried too far, or performed in such a manner as to induce full syncope, it is apt to bring on a paroxysm; and if it be not followed by purgatives, restricted diet, and regular exercise, it will only increase the tendency to plethora. The circumstances in which it should be prescribed, as well as those in which it ought not to be resorted to, have been explicitly stated; but the extent to which it should be carried, the particular situation and manner of performing it, and the repetitions of it, can be regulated only by the existing circumstances of the case, — by the habit of body, the state of the pulse, the modes of living, the strength of the patient, and the causes producing and tending to perpetuate the malady. Dr. HEBERDEN expresses himself strongly against bloodletting: but the class of persons amongst whom he practiced, and the inhabitants of large towns, subject to this disease, certainly are not so much benefited by this evacuation as those otherwise circumstanced; and yet, even in them, very small and often-repeated local depletion is frequently of great service.

76. *B. Purgatives*, and purgative enemata, have nearly all writers in their favour; and I believe that there is no class of medicines which is less capable of abuse in this disease than they. But the success of the practitioner will depend chiefly upon the selection and combination of them appropriately to the peculiarities of the case; and upon his firmness in persisting in them, when they are clearly indicated, although little apparent benefit at first results from them. The more drastic purgatives, as *elaterium, croton oil*, and the *hellebores*, have been prescribed; and are most suitable in the plethoric states, and apoplectic, paralytic, and maniacal complications of the disease. The fœtid, black, and even the white *hellebores* have been recommended from HIPPOCRATES to the present day; and are often very serviceable in the verminous and uterine varieties, and in the maniacal complication, in which they have been prescribed by CELSUS, ARETÆUS, ALEXANDER TRALLIANUS, SCHULZ, STARKE, SMYTH, GREDING, and PRICHARD. PLINY states that the tribune DRUSUS was cured of epilepsy by the black hellebore. The powder of the root, or the extract, may be given in doses of ten grains increased to thirty; or the decoction of the leaves or root may be employed. In the apoplectic and paralytic complications, the extract or decoction are advantageously given in enemata. The *oil of turpentine*, especially conjoined with *castor oil*, in order to insure its cathartic operation, is a very efficacious medicine, exhibited either by the mouth, or in clysters. It is, in the latter mode of administration, the safest and most active of antispasmodics that can be given during the paroxysm; and, when prescribed in energetic doses, and suitably combined, it produces a very remarkable

derivative action from the head, whilst it fully evacuates the intestinal canal, and stimulates the abdominal organs. Hence it is especially serviceable in the enteric, verminous, uterine, apoplectic, maniacal, and paralytic states of the disease. It has been employed successfully by Latham, Young (*Trans. of Coll. of Phys.* vol. v. p. 52.), Percival (*Edin. Med. and Surg. Journ.* vol. ix. p. 271.), Lithgow (*Ibid.* vol. xi. p. 301.), Prichard, and by myself (see *Med. and Phys. Journ.* for May and July, 1821.) The ancients, as well as the moderns, have depended also upon *scammony*, *colocynth*, and *aloes*; but of these, as well as of *calomel*, it is unnecessary to make further mention. Dr. Heberden was averse from the use of purgatives, excepting in the enteric variety, owing probably to the reason assigned above (§ 75.); and certainly, in the more asthenic states of the disease, and when the circulating fluids are deficient in quantity and quality, if trusted to mainly, they will be productive of mischief rather than benefit. In such cases, they should be given only on alternate days, or every third day, — should be of a warm and stomachic kind, or combined with tonics, and associated with the means recommended above (§ 67.). Thom, J. Frank, Kinneir, Mangold, &c., prefer *rhubarb*, the *neutral salts*, and the *supertartrate of potash*. This last, given in large doses, is most serviceable, when persisted in, if the vascular system be plethoric, and the biliary secretion in a morbid state. Galen and many recent writers have preferred *aloes*. In some one or other of its preparations and combinations, it is the most generally appropriate purgative that can be prescribed. With stomachic, chalybeate, and cardiac medicines, it is suitable in the asthenic cases; and combined with ox-gall, or with sulphate of quinine, or with bitter extracts, &c., it will act with very remarkable energy, and without depressing vital power, — a circumstance of peculiar importance in the treatment of epilepsy.

77. *C. Emetics* have been recommended by Aretæus, Alexander of Tralles, Zacutus Lusitanus, Ettmuller, Roncalli, Werlhoff, Lettsom, J. Clarke, and others. Van Swieten and J. Frank assign, with much propriety, the circumstances in which they should be given, in prescribing them only when the fits appear to proceed from disorder of, or the irritation of morbid or noxious matters in, the stomach. De Haen directs them when the paroxysm is preceded by nausea; Tissot, when a sense of weight, or a ravenous appetite, is felt; and Richter, shortly before the expected return of the fit. Mayer is favourable to the use of them, particularly of *ipecacuanha*, exhibited in doses short of producing full vomiting; and Marryat prefers those containing the *sulphate of copper*. Heberden considers them injurious; and Frank remarks, that he has never known an instance of a cure having been effected by them, although he believes that they have cleared the way for the action of other medicines. I agree with Meibom, in restricting them to the stomachic form of the disease, and in considering that they may be injurious in most other states, especially when there is much vascular fulness, or cerebral congestion.

78. *D. Diaphoretics* are much praised by Tissot and Lentin, who consider it of much importance to promote a free and equable perspiration, which is seldom observed in epileptics. *James's powder*, as prescribed above, or the other preparations of *antimony*, may be selected, particularly in plethoric persons; or the *vinum ipecacuanhæ* may be given with *liquor ammoniæ acetatis*, and the *spiritus etheris nitrici*. These are, however, most serviceable after other evacuations have been employed; and when the skin is dry; and then their operation may be aided by the tepid bath, as advised by Tissot and Marcard. Dr. Abercrombie, according to Dr. Cooke, has seen benefit from the *tartrite of antimony* given four times a day, in such doses as the stomach could bear. I had recently a patient under my care, who experienced a very severe attack whilst he was under the influence of this medicine.

79. *E. Emmenagogues* are required in those states of the uterine form of the disease that are connected with delayed, suppressed, or difficult menstruation. The *oil of turpentine* is one of the most efficient of this class of medicines that can be given in such cases, as fully shown by Dr. Prichard, more especially after *bloodletting* from the feet, or leeches to the groins and tops of the thighs, and the hip-bath, or semicupium, have been prescribed. The *sub-borate of soda* is also sometimes of service, either given alone, in doses of ten or fifteen grains; or in conjunction with other emmenagogues and antispasmodics, — more especially with camphor, or valerian, castor, ammonia, galbanum, assafœtida, aloes, &c. (F. 268. 368.) But, as M. Maisonneuve justly remarks, the restoration of the uterine functions to their healthy state is not always followed by a cure or even alleviation of the disease. When this is the case, the treatment must proceed according to the principles already explained. Marriage has occasionally removed the seizures, especially in the female, as remarked by Stahl (*De Dispos. Hered. ad Var. Morb.* p. 48.), Hoffmann (*De Epilep.* Opp. vol. iii. obs. 9. p. 20.), Krünitz (*De Matrimonio Multor. Morb. Remedio.* Franc. 1749.), Moreau (*Mém. de la Soc. Méd. d'Emulation*, t. ii. p. 189. — *in the male.*), and Prichard (*Op. cit.*). A young lady, whom I long attended on account of slight epileptic seizures, connected with irregularity of the uterine functions, and of the bowels, experienced, after marriage, a gradual amendment for some time; but had a very severe attack of puerperal mania after her first child. She is now in good health.

80. *F. Tonics and Antispasmodics.* — In the asthenic states of the disease, and in the other varieties, after bloodletting and the foregoing evacuations have been actively prescribed, remedies possessing a tonic and antispasmodic action are chiefly to be depended upon. But these should be selected with reference to the results of experience as to their operation, to the form of the disease, and to the particular features of the case, especially the states of sensibility and irritability, and of vascular fulness and action, generally and locally. But even when such remedies are most necessary, purgatives should be so conjoined, or so alternated, with them as to preserve a regular action of the bowels, or to occasion a brisker operation once or twice a week, according to the strength of the patient. In many cases, also, it will be requisite to administer tonics, and, still more frequently, antispasmodics, even contemporaneously with

local depletions, more especially when general or local plethora is associated with defective power and increased susceptibility.

81. *a.* Of *mineral tonics and antispasmodics*, the most active are the metallic sulphates and nitrates. — *α.* The preparations of *copper*, particularly the *cuprum ammoniatum*, or the simple *sulphas cupri*, have been recommended by Aretæus, Boerhaave, Van Swieten, Weizenbreyer, Duncan, Baumes, Thilenius, Theussink, Michaëlis, Cullen, Stone, Greding, Bland, Vogel, Willan, Battie, and Reil; and employed by them successfully in many cases. Drs. Home, Hook, and Magennis, however, state that they have found it to fail in most instances. Dr. F. Hawkins expresses himself much in favour of the *sulphate*, in doses of a fourth of a grain, conjoined with sulphate of quinine, or cinchona. In the asthenic states, and in the more plethoric forms, after depletions and evacuations have been prescribed, this combination, and the ammoniated preparation, frequently produce very great benefit, and sometimes entirely cure the disease. Dr. Urban (Hufeland, *Journ. d. Pr. Heilk.* 1827.) prefers the ammoniacal sulphate in the simpler states of the affection; and prescribes eight grains of it in forty-eight pills, of which three are to be taken night and morning, increasing the dose by one pill each second day.

82. *β.* The *sulphate* and *oxide of zinc* have been prescribed by Hart, Martini, Hartmann, Crell, Aasheim, Bell, Percival, Guthrie, Haygarth, Rush, Arnaud, Richter, and Ranoë. Osiander directs the zinc with valerian and orange leaves. The *oxide* has been preferred by most of these writers; and Dr. F. Hawkins advises it to be given with extract of conium. I have combined it advantageously with the ammoniated copper (F. 459. 598.), with camphor (F. 615.), and with valerian (F. 582. 665.); but I believe that the *sulphate* is more efficacious, especially when conjoined with camphor, musk, or other antispasmodics. (F. 584—587.). Upon the whole, zinc appears to be less useful than copper in this disease, although I do not rank it so low as Dr. Cullen and Dr. Cooke have done, who employed chiefly the oxide, which is frequently inert, unless it be exhibited in large doses.

83. *γ.* The *nitrate of silver* seems, from a passage in Stahl (*Theoria Med. Vera*, p. 1019.), to have been given in this disease as the principal ingredient of a secret medicine much employed in some parts of Austria at the time when he wrote; having been probably adopted from the preparation described by Angelus Sala, which consisted of a solution of the salt in wine; and which he directed in so large doses as to act as a cathartic. Schroeder, however, had already recommended it in epilepsy and other diseases of the head. Both Sala and Geoffroy prescribed it as a purgative in dropsies; but, although Schroeder and Boerhaave had mentioned it as a cure for epilepsy, it was scarcely used until Dr. Wilson noticed (Duncan's *Annals of Med.* vol. ii. p. 405.) its good effects. It was afterwards adopted by Dr. Sims, Dr. Cappe, Dr. Powell, and many others, who published proofs of its efficacy. Subsequently, Dr. Baillie, Dr. Roget, Dr. R. Harrison, Dr. J. Johnson, Dr. Cook, Dr. Sementini, M. Valentin, Dr. Heim, and others, have prescribed this medicine with advantage; and the more numerous observations of M. Lombard have also proved its success in a very large proportion of cases. The discoloration of the skin by it, noticed by Albers, Roget, J. Johnson, Vetch, and others, is so frequent, and so permanent when it does occur, as to be a serious objection to it. In some of the cases in which this effect was produced, the disease was not removed; but in others the recovery was complete. It does not seem to depend so much upon the largeness of the dose, as upon the long continuance of its use. Sementini (*Giornale di Fisica*, t. xi. p. 355.) recommends this salt to be triturated with some vegetable extract, and given in the form of pill; in this state the dose may be gradually increased to six or eight grains, or even more, in the day. I have prescribed it thus in several cases of epilepsy, and other diseases; and frequently with great benefit. It should not be continued very long, without intermitting it for a while. An eruption of minute pustules over the surface of the body, sometimes is produced by it, as first remarked by Sementini, and observed by myself; but this should be viewed as a favourable circumstance. The nitrate of silver appears to me most beneficial in the asthenic states of the disease; or after evacuations have been practised, in the other forms; also in the stomachic and enteric varieties, and in the complication with paralysis. I have generally combined it with hyoscyamus, or camphor (F. 473.), extract of belladonna (F. 472.), musk, opium (F. 475.), or gentian (F. 474.). The following is the mode of administering it adopted by Heim, an eminent physician in Berlin: —

No. 215. ℞ Argenti Nitratis in Pulv. gr. xij.; Opii Puri gr. vj.; Extr. Conii Maculati ʒij.; Extr. Glycyrrh. ʒj. Tere bene, et divide in Pilulas ponderis granorum duorum. Mane et vespere iij.—v. pil. capiat.

84. *δ.* The preparations of *iron*, especially the *sulphate*, and the *muriated tincture*, are often beneficial in the asthenic forms of the disease; or when depletions have been carried too far, and morbid matters have been evacuated. They have been much praised by Tissot, and by Quarin, who combined them with hellebore. I have directed them with valerian (F. 40.); with extract of hop; or with ox-gall, aloes, and myrrh. — *ε.* *Arsenic*, particularly Fowler's solution, has been employed by Pearson, Brugnatelli, Prichard, and A. T. Thomson. It requires much caution; as too large doses, or a too protracted use of it, may produce injurious effects, especially on the heart and arterial system. — *ζ.* The subnitrate of *bismuth* has been tried by me in two or three cases, both alone, and with other tonics and antispasmodics, the bowels having been kept freely open; and has appeared quite as beneficial as the preparations of zinc. — *η.* The *muriate of baryta* has been recommended by Hufeland and Gebel (Hufeland, *Journ. d. Pr. Heilk.* b. vii. st. 3. p. 177.), especially when the disease is connected with the scrofulous diathesis; the *aqua calcis*, by Tissot; and the *sulphuric acid*, by Ruland (*Curat. Empir.* cent. vi. obs. 96.), Rosenberg (*Rosa Jatrica*, cap. 30.), Hirschel, Feuerstein, and Hildebrand. The *nitro-muriatic* acids, in equal proportion, have been prescribed by me in tonic and astringent infusions, in only one instance, connected with

torpid function of the liver, and with some benefit; but the ultimate result is unknown to me.

85. *b.* Numerous *vegetable tonics* have been employed, in circumstances similar to those in which the foregoing are prescribed. — *α. Cinchona* and its preparations have been preferred, especially when the paroxysms were periodic, by Bang (*Acta Reg. Soc. Med. Hann.* vol. i. p. 106.), Buchhave (*Act. Med. Soc. Hafn.* vol. i. p. 224.), Frank, Chavalier, Comparetti (*Occursus Medici, &c.* p. 303.), De Haen, Cullen, Home (*Clinical Experiments, &c.* p. 194.), Pinel, &c.; and by Tode (*Med. Chirurg. Biblioth.* b. ii. p. 160.), with the ammoniacal salts. — *β. Orange leaves*, and the *bark* of the tree, have been praised by Thilenius (*Med. Chir. Bemerk.* p. 129.), Hannes, Fischer, Gesner (*Beobacht.* b. i. No. 19.), De Haen, Henning, Tissot, Locher (*Observ. Pract.* p. 44. 47.), Oberteuffer, Hufeland, &c. Quarin (*Animadvers. &c.* p. 23.), however, and Home, consider them inert. — *γ.* The *misletoe*, or *viscus quercinus*, was formerly much employed against this disease; and is evidently a medicine of great power. But the misletoe of the oak is procured with difficulty. It has been prescribed in epilepsy, probably from the time of the Druids. Gerarde (*Herball.* p. 1351.) mentions it as a popular remedy. Parkinson * (*The Theater of Plants*, p. 1394.) is much more copious respecting it; and Colbatch, in his treatise on its virtues, thinks it almost specific. The evidence of Borelli, Cole, Boerhaave, Van Swieten, Buchwald, Andree, Haller, De Haen, Quarin, and others, is also very much in favour of it. Dr. Frazer states, that out of eleven cases which he treated with it in the years 1802, 1803, and 1804, nine were completely cured. He prescribed it in powder, in the dose of from two scruples to two drachms, twice a day, in camphorated emulsion. Dr. Fothergill, Dr. G. Thompson, Mr. Haynes, and Dr. Willan, have also employed it successfully. On the other hand, Tissot, Cullen, Home, Good, and Cooke place no confidence in it; and, at the present day, it is almost wholly, and, perhaps, undeservedly, neglected, unless by empirics, whose success in this, as in other diseases, often depends upon the adoption of a once popular and efficacious remedy which had fallen into undeserved disuse. — *δ. Valerian* is mentioned by Dioscorides and Aretæus as a remedy in epilepsy. Fabius Calumna cured himself and others by it (*Phytobasanos.* Nap. 1592. 4to. p. 97.). Willis (*De Morb. Convul.* c. 24.), Panarolli (*Jatralogism. Pentecost.* i. obs. 33.), Cannengiesser, Marcard, Brisbane, Linnæus, Quarin, Haller, Fothergill, Sprengel, Unzer, and many others, have insisted on its efficacy when exhibited in sufficiently large doses. Thilenius (*Med. Chir. Bemerk.* p. 113—131.) and other German authors prefer its *essential oil*; and M. Guibert (*Rév. Médicale*, Dec. 1827, p. 376.) gives the *extract* in large doses. A powder, consisting of valerian and puff-balls, the *Lycoperdon Bovista*, is a popular remedy for the disease in Germany; and several writers contend that this latter substance is almost a specific for those fits which proceed from terror (Cooke). — M. Tissot placed great confidence in the efficacy of valerian, not only in epilepsy, but in all nervous affections requiring a gentle tonic and antispasmodic. Cullen, Home, Frazer, Woodville, Heberden, Tode, and Cooke, however, consider it a medicine of very little power — an inference much at variance with my experience of its effects, when appropriately exhibited; and depletions and evacuations have been premised, in plethoric cases. The powder of the root soon loses it activity by keeping; and, even when recent, often requires to be given in large doses. The ammoniated or camphorated tinctures, the extract, and essential oil, are useful preparations of it. The formulæ in the *Appendix*, particularly F. 81. 101. 269. 368. 582. 665. and 863., illustrate the mode of prescribing it; but in most cases of this disease, its quantity should be much increased. It may also be exhibited in enemata. — *ε.* The root of the *Artemisia vulgaris*, or mugwort, has been recommended by Burdach, Hufeland, and Loewenhard, in the dose of from 50 to 80 grains, on alternate days, or a few hours before the expected return of the fit, the patient being kept warm in bed. Hufeland prescribed it in ten cases, of which three were completely cured, three much relieved, and four received no benefit (*Rév. Méd.* 1824. t. iv. p. 447). Its operation, in the above dose, is tonic, diaphoretic, and diuretic. In plethoric cases, it should be preceded by depletions and cathartics (see F. 224.).

86. *ζ. Assafœtida* has been much employed, but seldom in sufficiently large doses, and not always in appropriate circumstances. It is advantageously combined with purgatives, and other tonics and antispasmodics (F. 367. 423. 480.). Lange (*Miscel. Verit.* p. 59.), Berger (*De Remed. Specif. in Epilep.* p. 13.), and Tissot, give it with valerian. With either castor, camphor, galbanum, myrrh, aloes, ox-gall, &c. (F. 368. 481, 482.), or any two of these, it is serviceable in the asthenic, dyspeptic, and enteric forms, and in the uterine variety after evacuations have been prescribed. It is one of the best medicines that can be given in enemata during either the fit or interval (F. 135, 136.).—*η. Galbanum* and *myrrh* are useful chiefly as adjuncts in these varieties; but they are less efficacious, singly, than assafœtida and the other substances just named. —*ϑ. Camphor* may be employed in every form of the disease, but in very different doses and combinations; in the plethoric states, in small quantity with diaphoretics and refrigerants (F. 24.); in the asthenic, enteric, and uterine varieties, in full doses with tonics and other antispasmodics (F. 35. 615.). Locher (*Observ. Pract.* No. 40.) prescribed it with bark; and Tissot, Pinel, and most modern writers have employed it, either as the chief agent, or as an adjuvant of other substances. When an immediate effect is required, it should be given in the form of draught or mixture, with the preparations of *ammonia* or of the

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* He states: — "The Missellto it selfe of the Oke is the best (or of the Chesnut tree, as Matthiolus saith to be as good), made into pouther, and given in drinke unto those that have the falling sicknesse: but it is fit to use it forty days together: and with this caution, that the wood, after it is broken from the tree, doe not touch the ground; which is in my minde too superstitious." — "Gentilis Fulginas, and others, have so highly esteemed of the vertues hereof, that they have called it *Lignum sanctæ Crucis*; beleeving it to helpe the falling sicknesse, apoplexy, and palsie very speedily."—"Divers doe esteeme of the Missellto that groweth on Hassell nuts, or Peares, as effectual as that on the Oke, so it touch not the ground, for the falling sicknesse, to be taken in wine."

æthers (F. 186. 212. 423. 845.). It often shortens the fit, or prevents it altogether when exhibited in enemata shortly before the usual period of accession, as in Formulæ 130. 135—138. 151.

87. *c.* Of *animal substances, castor, musk,* and *ox-gall* are most deserving of notice. — *α. Castor* is recommended by Aretæus, Celsus, Pliny, Serapion (apud *Cæl. Aurel.* p. 352.), K. Digby (*Experim. Med.* p. 332.), Moor (*Pathol. Cerebri,* p. 211.), Thouvenel (*Sur les Vertus des Subst. Anim. Medicam.* p. 357.), Tissot, and Fothergill. When unadulterated, and given in full or large doses, it is often of much service; especially in the asthenic, dyspeptic, and uterine varieties; and in the combinations advised in respect of assafœtida and camphor, with which (as well as valerian and musk) it may be conjoined (F. 480. 497. 905.). — *β. Musk* is also beneficial in these varieties, or in the other forms after evacuations have been prescribed, and in similar combinations to those mentioned with reference to the preceding substance. It is favourably mentioned by Feuerstein, Van Swieten, Quarin, Cullen, Ackermann, and others. Hannes made a full and successful trial of its efficacy on his own son (See *Nova Acta Nat. Curios.* vol. v. p. 244.). It should, unless intended merely as an adjuvant of other means, be given in much larger doses than usually directed. It may be conjoined with camphor, sulphate of zinc, &c. — *γ.* The *bile* of various animals, particularly of the ox, bear, and dog, has been noticed by Bartholin, Unzer, Quarin, and others. Of inspissated *ox-gall* I have had some experience in this complaint; but have usually directed it in combination chiefly with assafœtida, galbanum, myrrh, aloes, &c. (F. 558. *et seq.*). It is of much service in the states just particularised, and after depletions have been carried far, or to an injurious extent. In a case of this latter description, I am now employing it with very marked advantage.

88. *d. Cold* or *salt water bathing* has been advised by Celsus, Cælius Aurelianus, Floyer, Lentin, Tissot, and Hufeland; but it requires caution, and attention to its effects. In young persons and delicate females, who have not been accustomed to a plunge bath, the fear, or shock of immersion, may bring on the seizure: indeed, Wiekard (*Observ. Med.* Franc. 1775.) and Tode (*Med. Chir. Bibl.* b. i. p. 117.) adduce instances of such an occurrence. The *shower bath,* used daily, commencing with tepid water, and gradually reducing the temperature, in cases where the shock may be dreaded, is of much less equivocal benefit; and is, in all the varieties, but in the simple or cerebral forms especially, a very excellent remedy. When it cannot be employed, the patient should daily affuse water from a large sponge over the whole head and occiput.

89. G. Numerous substances evincing more of *stimulating,* than of tonic and antispasmodic, properties have been prescribed, with occasional success; but, in general, in combination with one another, or with medicines producing an astringent or tonic effect.— *a.* — *α.* The oil of *hartshorn,* or Dippel's animal oil, was very generally used, both internally and externally, especially during the last century, owing to the recommendations chiefly of Dippel (*Disquisit. de Vitæ Animalis Morbo et Med. &c.* p. 89.), Alberti (*De Med. in Motibus Nat. Exacerbatis.* Halæ, 1718.), Vater (*De Specificor. Epilep. Sigillatim Olei Animal. Virtutibus.* Vitel. 1725.), Mauchart (*De Oleo Animal. Dippellii.* Frib. 1745.), Juch, Kortum, Bang, Thouvenel, Cullen, Morand, and Portal. Feuerstein believes that, when it is pure, and not altered by the action of the air, it is often beneficial. Ackermann considers it possessed of no small efficacy in the asthenic forms of the disease, particularly those connected with anæmia, and languor; but hurtful in the irritable and plethoric states. Quarin advises it in the uterine variety. Tissot, however, thinks it possesses but little power. — *β. Cajeput oil* was prescribed with benefit by Goetz (in *Commerc. Lit. Noric.* 1731, p. 5.), in doses of from two to ten drops on sugar; and by Werlhof (*Oper. Med.* p. 711.), with cinchona. — *γ.* The *oil* and other preparations of *amber* have been found sometimes useful by Riverius (*Prax. Med.* p. 32.), Beattie (*De Cognoscend. et Cur. Morb. &c.* Halæ, 1780.), Cullen (*Mat. Medica,* vol. ii. p. 361.), and others. The oils of hartshorn, cajeput, valerian, and amber, are serviceable chiefly in the simply nervous and asthenic states of the disease; and are useful adjuvants of other medicines, and are often beneficially conjoined with narcotics (§ 97.). Besides these, other oils, both simple and medicated, have been prescribed; but they hardly deserve enumeration.

90. *b. Phosphorus* was, I believe, used for epilepsy first by Kramer (in *Commerc. Lit. Noric.* 1733, p. 137.); and more recently by Feuerstein, Quarin, and others. Weikard, Autenrieth, and Hufeland justly view it as a doubtful and dangerous remedy. Haartmann (*De Noxio Phosph. in Med. Usu, &c.* Aboæ, 1773.) gave it in four cases without benefit. — *β. Cantharides* has been tried internally, by Mercurialis (*De Morb. Pueror.* l. i. c. 3.), Zacutus Lusitanus (*Prax. Admirab.* l. i. obs. 35.), Stockar (*De Usu Canth. Interno.* Goet. 1784. p. 34.), and Dr. J. Johnson (*On Derangements of the Liver, &c.* p. 105.), with occasional advantage. Its external use, is, however, more common, if not more beneficial, in this complaint.

91. *c. Guaiacum,* either in decoction or substance, has been employed by Vesalius (Haller's *Bibl. Med. Pract.* vol. ii. p. 32.), Willis (*De Morb. Convuls.* p. 460.), Sennert (*Prax. Med.* l. i. c. 31.), Mercurialis (*Respons. et Consult.* l. ii. c. 3.), Forestus (*Observ. Med.* l. x. obs. 58. 63.), F. Hoffmann (*Med. Rat. Syst.* t. iv. p. iii. c. i. p. 21.), and others, who considered it possessed of much efficacy in this complaint, especially if connected with a syphilitic taint; but it has been neglected by more modern writers. — *γ.* The flowers of the *Cardamine pratensis* were found beneficial by Berger and Nagel (*De Usu Med. Card. Prat. &c.* Franc. 1793. p. 13.); but Baker (*Trans. of Coll. of Phys.* vol. i. p. 443.), Lysons (*Pract. Essays, &c.* p. 173.), and Greding, state it to be inefficacious. The saturated infusion of the flowers and leaves produced a copious and fœtid perspiration in the experiments made with it by Berger (*De Remed. Spec. in Ep. &c.* Franc. 1795. p. 11.) — *δ.* The *Arnica montana* has likewise been noticed by Stoerck; and the *Serpentaria,* by Gruelmann, when the attack has been occasioned by fright.

92. *d.* The *extract of nux vomica* was praised

by Sidren (in *Acta Med. Suec.* t. i. Upsalæ, 1783. p. 367.), Rese (*De Nuce Vomica.* Jenæ, 1788. p. 20.), Hufeland (*Journ. d. Pr. Arzneyk.* b. i. p. 109.), and Vieweg (in *Annal. der Heilkunst*, Mai, 1811. p. 426.); and its active principle, *strychnine*, was prescribed by Dr. Brofferio (*Révue Méd.* t. iv. 1825, p. 488.), in this disease. I have tried the former preparation in two or three cases, and conjoined it with aloes (F. 541, 542. 907.). It is a powerful remedy in the asthenic forms of the disease, and in the paralytic complication, connected with inanition, or consequent upon excessive evacuations. When the fits follow the disappearance of the menstrual discharge, it is of especial service. Löbenstein-Löbel recommends the *tincture of nux vomica*, beginning with sixteen drops every three hours, and gradually increasing the dose to thirty or even to forty. This medicine is most injurious in the plethoric, inflammatory, and irritable states; and, if carried too far, is liable to excite inflammation of the membranes of the brain and spinal cord. These remarks apply equally to *strychnine*, which should be given in very small doses, and with strict attention to its effects (F. 565.). The *Strychnos Sancti Ignatii*, or the *Ignatia amara*, has been prescribed by Stein and Valentin. It operates similarly to the foregoing, and requires equal caution in its use. The secret remedy for epilepsy employed by Witz, father and son, is said by Dr. Haase to have consisted chiefly of the powder of this bean. It was found most useful against the fits following excessive fear; and was given in doses of two or three grains twice or thrice daily. (*Bullet. des Sc. Méd. de* Férussac, t. xi. p. 74.)

93. *e.* The *pæony* (*Pæonia officinalis*) entered, in conjunction with various vegetable antispasmodics and tonics, into many of the empirical remedies so much employed in epilepsy. The dried root, seeds, and flowers, and the recent expressed juice of the root, were chiefly used; and, with other writers, old Parkinson (*Theater of Plants*, p. 1382.) directs the male plant to be selected. The root was formerly hung around the neck as a charm against a return of the fits. Although praised by Berger, Forestus, Willis, Riverius, Appel (*De Epilepsia.* Alt. 1713. p. 39.), Schacht (*Instit. Med. Pract.* p. 64.), Murray (*Appar. Medicam.* t. iii. p. 40.), De Haen (*Rat. Med.* par. vi. p. 317.), and Vogel (*Hist. Mat. Med.* p. 206.), no confidence is placed in it by Sylvius (*Op. Med.* p. 427.), Herrmann (*Cynos. Mat. Med.* Argen. 1726. p. 176.), Moor (*Path. Cereb.* &c.), Haller, and Tissot. The imperfect trials made of it by Home (*Clin. Experim.* 2d ed. p. 209.) showed it was not without effect. This contradictory evidence is easily explained by the empirical mode of prescribing it; like the other medicines classed under the present head, it being appropriate only in the asthenic cases, and in the uterine variety after evacuations have been practised. — The *Sedum acre*, or wall-pepper, was used in Germany, as a popular anti-epileptic, before it was noticed as such by medical writers. Laubender, of Saxony, first prescribed it, and gave from ten to fifteen grains of the dried plant for a dose. Ischorn (Hufeland, *Journ. d. Pr. Heilk.* b. xiii. p. 167.) afterwards resorted to it with success. Peters (*Biblioth. Med.* t. vii. p. 116.) tried it with five patients, one of whom was cured, and the others relieved. M. Fauverge (*Journ. Génér. de Méd.* t. xcvii. p. 152.) employed it in four cases, three of which were cured. In these, bleeding was premised and vegetable diet directed: and very recently, M. Godier (*Ibid.* t. cviii. p. 141.) has given it in three cases, but with benefit in two only.

94. *f.* *Rue* (*Ruta graveolens*), and its distilled water, decoction, infusion, expressed juice and oil, were formerly much employed in epilepsy, especially by Forestus (*De Capitis et Ventris Morbis.* 1590. 8vo.), Mayerne (*Prax. Med.* p. 20.), Moor, Riedlin (*Lin. Med. Ann.* iv. 1698. obs. 25.), and Stenzel (*De Ruta Medicam. et Venen.* Viteb. 1735.). Pliny (l. xx. cap. 13.) mentions the use of the decoction before the expected return of the paroxysm; and Boerhaave (*Consult. Med.* Goet. 1752. p. 28.) frequently confided in the distilled water and infusion. It, as well as the sedum acre, should be prescribed only in those cases, to which I have restricted the pæony.—The extract, infusion, and powder of the flowers of the *Narcissus pseudo-narcissus* have been recommended by Lauremberg (*Appar. Plant.* l. i. cap. 18.), and Du Fresnoy (*Des Propriet. du Narcisse de Près.* Paris, 1788.), in such doses as will not irritate the stomach. The *Viola odorata*, and *V. tricolor*, also, have been noticed by Dioscorides, Pliny, Matthioli, and Haase, as anti-epileptic medicines.

95. *g.* The frequent dependence of epilepsy on the scrofulous taint, or upon morbid structure, induced me several years since to employ *iodine* in the treatment of it; but the utmost discrimination and caution are required in the use of this substance; for it may be injurious in the inflammatory and plethoric states of the complaint, or if given in too large doses, or even for too long a period. It is indicated chiefly in the asthenic conditions, and in the paralytic complication if independent of inflammatory action. The *hydriodate*, or the *ioduretted solution* of it, or the *ioduret of iron*, may be preferred. But the iodurets are often uncertain as to the relative proportion of the metal and iodine. The *ioduret of mercury*, although a promising combination in this disorder, was prescribed by Dr. Roots, until the gums were affected, but without permanent relief.— I have found the ioduretted solution of the hydriodate most serviceable, given in very small doses three or four times a day: blue pill, and the aloes and myrrh pill, or any other gentle stomachic aperient, having been taken at bedtime. A patient at present under my care is pursuing this treatment with great benefit.

96. *h.* *Petroleum, mineral oils, and naphtha*, especially the former, have been recommended by Dioscorides (l. i. cap. 85.), Wedel (*De Epilepsia.* Jenæ, 1676.), and Gmelin (*Appar. Medicam.* vol. i. p. 185.). Ramazzini (*Opera*, p. 320.) has published a curious tract, written about the middle of the fifteenth century by Francis Ariosto, in which petroleum is said to have been employed successfully against this disease.—The ætherial preparation from *caouchouc* seems deserving of a trial in the simple or nervous states of the disease.—Of the preparations of *ammonia* and of *æther*, little further need be stated. They are useful adjuncts—(especially the

spir. ammon. fœtid., the spir. ammon. succin., and the tinct. valerianæ ammoniata)—to tonic or other agents, in the nervous or asthenic conditions of the complaint; and are sometimes serviceable when the accession of the paroxysm is indicated by failure or irregularity of the heart's action, or by other symptoms depending upon deficient nervous power. In such cases, the patient should be provided with a medicine, into the composition of which these preparations very largely enter (F. 210. 423, 424.), and have immediate recourse to it upon the recurrence of these symptoms.

97. *H.* The propriety of giving *Narcotics* and *Anodynes* in epilepsy is sometimes questionable. Yet cases frequently occur in which they may be prescribed, not only with safety, but with advantage, in judicious combinations, and after plethora, general or local, has been removed, and morbid secretions evacuated. — *a.* *Opiates* were employed by Aëtius (*Tetrab.* iv. ser. i. c. 96.), Avicenna, Millars, Morgagni, De Haen, Tralles (*De Usu Opii*, sect. iii. p. 16.), Tissot, Murray (*Appar. Med.* t. ii. p. 272.), Cullen (*Mat. Med.* vol. ii. p. 247.), Fothergill (*Med. Observ. and Inquir.* vol. vi. p. 80.), Rehfield (Doering's *Tracts*, vol. i. p. 160.), and Cooke. They should not be exhibited in the plethoric or inflammatory states, until evacuations have been carried to the utmost extent; nor in any form of the disease, until the bowels have been fully and frequently purged, and the secretions have assumed a natural character. In these circumstances, and in the asthenic conditions of the complaint, they are often valuable remedies; more especially if the attacks have proceeded from fright, or other affections of the mind, or are connected with an irritable or susceptible state of the nervous system. Aëtius and Avicenna gave *opium*, with various stimulating antispasmodics; Sennert (*Medicinæ Pract.* vol. i. p. 370.), with camphor: Duchesne, with aromatics: Aäskow, with assafœtida; Huxby, with musk; and Ferriar (*Med. Hist. and Reflect.* vol. i. p. 34.), with musk and camphor. De Haen and Darwin prescribed it alone, at bedtime, successfully, in cases in which the fits came on during sleep. Ward and Portal applied it with benefit, externally to the part which appeared to be the seat of irritation. Panzani (*Giornale di Med.* t. xiii. Ven. 1776.) exhibited as much as four grains with advantage in a case complicated with maniacal delirium. It is seldom of any use in the hereditary disease, or in that occasioned by the suppression of accustomed evacuations,— indeed, it may be injurious in the latter; and, as Quarin (*Animad. Practica*, p. 20.) justly remarks, it may induce a state of apoplectic torpor, when given during the paroxysm. The preparations of *morphine*, especially the *acetate*, in the liquor ammoniæ acetatis and camphor julap, or with an aromatic spirit, are frequently preferable to the pure opium, and less likely to affect the head injuriously. I have found the following draught to agree even with those who could not take opium in any of the more usual forms: —

No. 216. ℞ Morphinæ Acetatis gr. ¼; solve in Liq. Ammoniæ Acetatis ʒjss., et adde Mist. Camphoræ (vel Aq. Destillatæ) ℥j.; Spirit. Caryoph. ʒj.; Olei Anisi ♏iij. M. Fiat Haustus.

98. *b.* *Stramonium*, principally its *extract*, has been much employed in epilepsy, by Continental writers. Stoerck (*Libellus, quo demonstratur Stramonium, &c.* Vindob. 1762.), who first prescribed it in this complaint, gave from half a grain to a grain of the extract, three, four, or six times a day, for several weeks or months. It afterwards was approved of by Wählin, Spalowsky, Durande (Gardane's *Gazette de Santé*, 1773 et 1774, p. 143.), Sidren (*De Usu Stramonii in Convuls.* Ups. 1772.), Razouz (*De Cicuta, Stramonio, &c.* Nem. 1780. 8vo.), and others. Odhelius (*Comm. Acad. Suec. Stock.* vol. xxvii. p. 277.) prescribed it in fourteen cases of epilepsy and convulsions, eight of which, he says, were cured, and five relieved. Greding (*Sammtl. Schrift.* th. i. p. 102.), however, states, that of twenty-eight epileptics, it cured only two, permanently relieved four, and temporarily relieved eleven. He remarks, that aperients, tonics, and antispasmodics should also be exhibited. Arnemann (*Pract. Arzneimittellehre*, th. i. p. 279.) advises it to be given in the form of pill with camphor and bitter extracts.

99. *c.* *Hyoscyamus*, as well as stramonium, is indicated only in the circumstances and states of the disease pointed out when remarking on the use of opium and morphine (§ 97.), and in similar combinations to them. Mayerne (*Synt. Prax. Med.* Lond. 1690. p. 23.) prescribed the *seeds*, commencing with six or eight grains, gradually increasing, in the course of forty days, the dose to twenty-four grains; and directed them to be taken in the expressed juice of the *sempervivum*. Stoerck employed the *extract*, the preparation adopted also by Sauvages, Lentin, Bang, Greding, and Oberteuffer, who derived from it only slight or temporary advantage. —*Conium* has likewise been employed by Stoerck and some other writers, chiefly with liquor potassæ, when the disease is connected with the scrofulous taint.

100. *d.* The powdered *root and leaves of belladonna*, and the *extract*, are recommended by Münch, father and son, Stoll, and Bottcher. Richter, Löbenstein-Löbel, and Hufeland (*Journ. d. Pr. Arzn.* b. ix. p. 100.) prescribe either of these, with tonics, antispasmodics and aperients, according to the nature of the case. Greding (Ludwig's *Adversaria*, b. i. par. 4.) considers this plant to possess but little efficacy. Kaufer and Münch, the son (*De Usu Belladonnæ in Melanchol. et Epileps.* Goet. 1783.), however, contend, that it is especially beneficial when the fits are followed by maniacal alienation or tremors. It is most suited to the atonic states, conjoined either with ammoniated copper, or with nitrate of silver (F. 472.), or with musk, castor, camphor, &c. —*Tobacco* is stated, by Sennert, Zacutus Lusitanus, and Dupau (in *Journ. de Méd.* Sept. 1789.), to have been used successfully, in the form of clyster, in the stomachic and verminous associations of the complaint. Currie directed epithems of the infusion over the epigastrium before the accession of the fit, with benefit.

101. *I.* There are many other substances which have been employed internally in this disease.—*a.* *Digitalis* is one of the most important of these. Parkinson (*Theater of Plants*, p. 654.) remarks, respecting it, that "divers have been cured of the falling sicknesse thereby; for after taking of the decoction of two handfulls thereof, with four ounces of the *Pollipody* of the oake

bruised, in ale, they that have been troubled with that disease twenty-six years, and have fallen once a week, or two or three times a moneth, have not fallen once in fourteen or fifteen moneths." Salmon and Withering also praise it; but Currie (*Mem. of the Med. Society of Lond.* vol. iv. p. 18.) gave it in three cases with only temporary benefit. Dr. Percival (*Edin. Med. and Surg. Journ.* vol. ix. p. 271.) also tried it unsuccessfully, but in an unsatisfactory manner; for it is not by the empirical exhibition of one or two large doses of this medicine, that good effects can be obtained from it in a chronic complaint. Its efficacy in small doses has been shown in two cases (*Amer. Med. Recorder*, No. 2.); and in one that came under my own observation. It has been favourably noticed also by Dr. Briggs and Mr. Scott (*Edin. Med. Journ.* Jan. 1827.); and by Knight, who has found much benefit from it in epileptic insanity. Dr. Sharkey recommends an infusion of it in porter to be given until vomiting supervenes. It is advantageously exhibited also in conjunction with tonics, antispasmodics, and anodynes (F. 456. 469. 514. 537.); and is most serviceable when the disease has been caused by fright, or is connected with disorder of the heart.

102. *b.* The *preparations of mercury* have been used in epilepsy for their alterative effect, and in combination with various antispasmodics, or with antimonials. Of the propriety of these in the venereal and hepatic associations of the complaint, no doubt can be entertained. But in other circumstances they require discrimination. In the inflammatory or congestive states, and either alone, or with *James's powder*, they are often beneficial, although they be carried so far as to affect the mouth. Piso and Rolfinck, Scardona, Walther, M. Hoffmann (*Eph. Ac. N. C.* cent. 1. et 2. p. 272., *et Ibid.* cent. 3. et 4. p. 231.), and Rahn, have adduced proofs of the good effects of salivation in some instances. When we reflect on the frequency of serous effusion in the cavities, and of alterations of the coverings of the brain, in fatal cases, a judiciously conducted course of mercury, independently of the evidence of Willis, Riedlin, Ettmuller, Locher, Tissot, Burseri, Lysons, Frank, Spörry (*Ueb. die Würk. des Quicksilbers in der Epil.*, in *Mus. der Heilk.* b. i. No. 35.), and others, in its favour, promises some benefit. It is chiefly, however, in the more *active conditions*, or when the malady presents the apoplectic, inflammatory, maniacal, or paralytic complications; or follows some acute cerebral disease, and the pulse retains considerable firmness; that mercury, given so as to affect the mouth, is most likely to be serviceable. In these, calomel or blue pill with antimonials, or mercurial inunction, may be employed; but in the *more asthenic* and *chronic cases*, either these preparations should be conjoined with antispasmodics, as camphor, castor, or musk, as directed by Bang; or the sublimate should be given dissolved in sulphuric æther (J. Frank), or in tincture of bark; or hydrarg. cum cretâ, or Plummer's pill, with James's powder, Castile soap, or any other substance that the peculiarities of the case will suggest.

103. *c.* The elutriated *oxide of tin* has been recommended by Dr. Shearman, in the dose of two scruples to a drachm to an adult, night and morning, continued for four or five days, an active cathartic being exhibited on the fifth day, and the tin again resumed, according to its effect.— The *superacetate of lead* has been prescribed by Mayerne, Saxtorth (*Acta Reg. Soc. Med. Haun.* vol. iii. p. 90.), Rush (*Philad. Med. Mus.* vol. i. p. 60.), and Eberle (*Lond. Med. Repos.* vol. viii. p. 178.); and the *hydrochloric acid*, by Larrey, chiefly in the syphilitic and cachectic states.

104. *d.* The *Agaricus muscarius* has been found serviceable in doses of from ten to twenty grains, by Whistling (*De Virtut. Agar. Mus. &c.* Jenæ, 1773. p. 13.); the *Boletus suaveolens*, in doses of a scruple four times a day, by Enslin (*De Bol. Suav. &c.* Erling. 1784. p. 77.); the *Aconitum napellus*, by Durande; the root of the *Dictamnus albus*, by Stoerck; the seeds and root of the *Heraclium spondylium*, in doses of two or three drachms of the latter, by Pliny (*Hist. Nat.* l. xxiv. cap. 6.) and Orne; the root of the *Tussilago petasites*, by Cranz (*Nat. Med.* par. ii. p. 162.); the *colchicum*, by Alderson (*Lond. Med. and Phys. Journ.* vol. xxxvii. p. 17.); the *Hyssopus officinalis*, by Forestus, Ruland, and Sennert; the flowers of *pimpernel* (*Anagallis arvensis*), in doses of twenty grains three or four times a day, by Dioscorides and Gasser; the expressed juice of the *Galium luteum*, in doses of two or three ounces in the morning, by Chomel (*Plant. Usuelles, &c.* t. ii. p. 24.), Gardane (*Gaz. de Santé*, 1773, p. 19.), and Wendt (*Klin. Annal.* p. 146.); the seed of the *Lycopodium clavatum*, by Schroeder and Kuhn; the *Lunaria rediviva*, by J. Frank; the watery extract of the leaves of *yew* (*Taxus baccatus*), in from one to ten grains in the day, by Loder (*De Taxo Baccato.* Jenæ, 1794. p. 17.) and Hufeland, in uterine epilepsy; the *Cocos nucifera*, by Thunberg; the flowers of the *Anchusa officinalis*, by Brutz and Baldinger; the *Bryonia alba*, by Reusner; the essential oil of the *Buxus sempervivens*, by Schroeder and Vogel; the flowers of the *Lilium convallium*, by Senkenberg, Baldinger, and Langhan, in doses of a scruple to a drachm, in the periodic type of the complaint; the powdered leaves, the decoction, and the essential oil of the *Origanum majorana*, by Dioscorides, Schroeder, and Fonseça; the berries of the *Sambucus niger*, by Dufour; the decoction of the *Solanum dulcamara*, by Boerhaave, in epilepsy from metastasis; the flowers and root of the *Tilia Europea*, by Hoffmann, Ruland, and Tilemann (*De Mat. Med.* p. 308.); the *Verbena officinalis*, by Sebitz and Rosenstein; and the distilled water of the *Prunus laurocerasus*, by J. Frank. Neither of these require any remark, excepting this last, which, from the quantity of prussic acid it contains, is sometimes not without efficacy. Its active constituent, *prussic acid*, is occasionally beneficial in the simple states of the complaint, after plethora has been removed, and the bowels fully evacuated, or when the disease is connected with great susceptibility and irritability, or is dependent on pain, local irritation, or gastric disorder.— Of internal treatment, generally, it may be added, that every medicine will fail, or afford merely temporary advantage, as long as plethora exists, or active determination to the head is unrestrained, and the appetites are indulged. And I must subscribe to the justice

of Heberden's remark :—"Etenim nulla sunt remedia, quæ non toties spes nostras fefellerunt, ut incertum sit quantum illis debeatur, ubi visa sunt profuisse." (*Comment. &c.* p. 143.) It is chiefly by a judicious sequence, and combination of remedies; and by a well-devised plan, having strict reference to the circumstances of the case; that we can hope to treat this malady with success.*

105. *K. Electricity* was formerly much employed, but is now seldom tried, in epilepsy. Deshais, Mangin (*Hist. de l'Electr.* par. iii. Paris, 1752.), Morris (*Gent. Mag.* 1753. p. 379.), Linnæus (*Consect. Electrico-Medica.* Ups. 1754.), Franklin, and Lovet (*Elect. rendered useful in Med. Intentions.* Lond. 1760.), furnished the earliest notices of its use; but these were unsatisfactory, and almost contradictory. The more extensive experience, however, of Feller (*De Therapia per Electrum.* Leips. 1785.), Feuerstein, Deimann, and Kühn (*Geschichte der Med. u. Phys. Elect. &c.* Leips. 1785. 8vo.), demonstrated — what indeed might have been inferred *à priori* — that it is occasionally successful in cases characterised by debility, inanition, or torpor of the vital functions, and in those occasioned by frights; but that it is seldom beneficial, and may even be injurious, in the acute, plethoric, inflammatory, and hereditary states of the complaint. In cases caused by suppressed discharge, it is not always a safe remedy: for, although the experiments of Spengler and Kühn have furnished instances of its success in such; yet those of Linnæus, Feller, and Quarin, show that it was either inefficacious or hurtful, unless evacuations had been premised. Of the effects of *galvanic electricity*, the evidence is but little different from the foregoing. Mr. Whitlam (*Lond. Med. Phys. Journ.* vol. xiv. p. 527.), Dr. Duncan (*Ann. of Med.* vol. viii. p. 339.), and Mr. Mansford, have detailed cases where this agent proved of service; but the last-named writer admits, notwithstanding his views as to the nature of the disease (§ 50.), that galvanism can often rank only as an auxiliary means. His plan of employing this agent is peculiar; and, although it may be the most rational and efficacious, it is seldom possible to have recourse to it; for, granting that the physician may manage, in the way Mr. Mansford directs, constantly to inclose the body of his patient within the circle of a galvanic battery; yet it may not prove successful, or the benefit derived may cease with the discontinuance of its use. Of electricity and galvanism, it may be said generally, that they have occasionally been found successful: that, when resorted to shortly before the seizure, they have sometimes suppressed it, or rendered it more mild; that, when applied during the paroxysm, they have often mitigated its violence and duration; and that the safest mode of employing electricity, is to place the patient on the insulating stool, and subject him to the *electric bath;* and to draw sparks from different parts, when thus insulated and placed in connection with the prime conductor.

106. *L. Of external means,* the most deserving notice are setons, issues, moxas, open blisters, and artificial pustulation. — *a.* The *actual cautery,* applied to the nape of the neck, the occiput, and even to the vertex, is recommended by Aretæus, Celsus, Cælius Aurelianus, Avicenna, and several writers of the sixteenth and seventeenth centuries. At the present time, *moxas* have nearly superseded the cautery, and have received the sanction of the most experienced writers, especially Esquirol and Larrey; the former of whom directs them along the cervix and spine, he having observed disease of the medulla oblongata and spinal cord in several instances.

107. *b. Setons* and *issues* have been directed by nearly every writer on the disease. In the cerebral variety with determination to the head, they are often serviceable; but in the asthenic forms, or when evacuations have been carried too far, and when susceptibility and irritability are augmented, they often either fail, or increase the disorder, unless tonics and antispasmodics be administered. The nucha is the place usually selected for their insertion, but the insides of the arm, or thigh, are often preferable situations. Zacutus Lusitanus (*Prax. Admir.* l. i. obs. 22.), Ab-Heers, Rochard, and Locher, direct either them, or the *actual* or *potential cautery,* to the seat of the aura. M. Andral prefers the latter means, and advises their application to a limb in preference to the nucha or occiput. An accidental burn of the limb, followed by ulceration, has not infrequently effected a cure, as in the case detailed by Dr. Bona (Hufeland's *Journ.* 1827.).

108. *c. Artificial pustulation* by tartarised antimonial ointment, applied to the nucha, occiput, or vertex, has been found serviceable by Dr. Carter (*Lond. Med. Repos.* vol. xix. p. 382., and vol. xxi. p. 369.), Mr. Creighton, and Dr. Mills, but it has, like all other agents, also failed. Horn (*Archiv.* 1812, May, p. 573.) directs this ointment to be rubbed on the part where the aura commences. — *d.* The propriety of exciting irritation in the scalp itself is questionable in the inflammatory, plethoric, and acute cases; although Aretæus recommends it, and Alexander Trallianus advises *mezereon bark* to be applied to this part. Where the disease has followed the suppression of an eruption in this situation, the antimonial ointment, or the mezereon bark, or blisters, are very appropriate applications. In the more obstinate and chronic cases, and after free evacuations in the more acute, *blisters* kept freely open, on the occiput, behind the ears, or on other parts of the

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* M. Borie's plan of treating epilepsy, which is in great repute in Paris, is as follows: — Having premised a small bloodletting from the feet, exhibited an emetic, and acted on the bowels by means of four grains of calomel and an ounce of castor oil, he directs, every morning fasting, twenty drops of the distilled laurel water, in a glassful of sugared water; increasing the dose one drop daily until it reaches sixty, when that quantity is continued; and, every night, two drachms of the leaves of the *artemisia,* in powder, in the infusion of the *tilia Europea.* He applies, every fortnight, moxas — not exceeding six — along the spine, from the occiput downwards; causes the lower extremities to be well rubbed, with some ætherial preparation, twice daily; and leaves a bracelet on the left arm, which is to be drawn very tight upon the approach of the fit. He allows the patient only water for his drink, and restricts him to vegetable diet. He further directs sea-bathing — the head being first immersed — or the shower bath, and exercise in the open air, avoiding exposure to the sun: and lastly, he enjoins him — "Eviter les émotions vives, les emportemens de colère, les occupations sérieuses, les tensions de l'esprit, les lectures obscènes, la frequentation des spectacles, les contrariétés, les habitudes extenuantes, l'onanisme, les plaisirs vénériens," &c. (*Journ. des Progrès des Scien. Méd.* t. ii. D. S. p. 226.)

scalp, are prescribed by RIVERIUS, PISO, HOFFMANN, MEAD, PERCIVAL, and others. — *e. Scarifications of the scalp*, particularly on the occiput, are directed by CELSUS and CÆLIUS AURELIANUS, and are deserving of adoption in modern practice. —*f. Dry cupping* on the neck and between the shoulders shortly before the expected return of the fit, has been prescribed by me, with slight benefit, in some cases in which depletion had been carried as far as was judged prudent.

109. *M.*—*a. Ointments* containing the active principles of various medicines, as *strychnine, veratria, acetate of morphia*, &c., have very recently been tried in epilepsy, and are calculated to prove serviceable in some of its states; but, as yet, the results have not been such as to admit of further remarks. — *b.* Variously *medicated epithems* have likewise been resorted to, applied chiefly on the epigastrium, or along the spine. I have directed them in a few instances with advantage, particularly in children, and have generally employed modifications of F. 311. 313. and 770. in this manner. — *c.* The *endermic method*, or the application of various active substances to the skin denuded of its cuticle, has recently been tried on the Continent, in this disease. It possesses this advantage, — that it combines the operation of medicinal agents on the nerves of the part, and on the circulation, with external irritation; and it therefore deserves a cautious adoption, and more extended trials than have hitherto been made of it.

110. *N.* Immediate *ligature* of a limb or part, above the situation in which the aura commences, has been favourably noticed by GALEN, ALEXANDER TRALLIANUS, RHAZES, AVICENNA, SCHENCK, GREDING, LYSONS, PEW, CULLEN, &c., and is generally recommended when the fit is preceded by an aura. It sometimes wards off the seizure; but it fails of doing so, as often as it succeeds, although it may have been sufficiently early employed.

111. *O.*—*a.* ARETÆUS is the earliest author who has noticed *trephining* the cranium in epilepsy, and the circumstances in which it may be performed. CÆLIUS AURELIANUS was opposed to the practice, although he states THEMISON to have been in favour of it. Instances have, however, been recorded by ABERNETHÈ (*Quæst. Medicæ Monspel. &c.* Monps. 1617.), RHODIUS (*Observ.* cent. i. obs. 66.), VAN DER WIEL (*Observ. Med.* cent. i. obs. 8.), MARCHETTIS (*Observ. Chirurg.* Patav. 1664.), LA MOTTE (*Chirurgie*, t. ii. p. 409.), LYSONS (*Essays, &c.* p. 111.), KITE, TISSOT, and others, where external injury, and circumscribed disease of the bone or scalp, have furnished indications to warrant the performance of this operation; and where it was resorted to with success. It has also been practised recently with benefit. Dr. ELLIOTSON refers to a case in St. Thomas's Hospital, where the trephine removed a piece of bone with a spicula from its inner surface, and cured the disease. Other successful instances are recorded by Dr. GUILD (*Med. and Chirurg. Review*, vol. xii. p. 504.), and Dr. BLAKE (*Lond. Med. and Phys. Journ.* Jan. 1826.). — *b.* The much less feasible experiment of *tying the common carotid*, in order to cure the disease, has been suggested by Mr. EARLE, and actually practised by Mr. PRESTON (*Trans. of the Med. and Phys. Soc. of Calcutta*, vol. v.); but its ultimate success is not apparent. — *c. Pressure on the carotids* has been advised by Mr. EARLE; but it is probable, that the obstruction it must occasion to the return of blood from the head, will be as injurious as the diminution of the supply may be beneficial.

112. *P. Travelling, and change of air and of residence*, are sometimes serviceable; and are recommended by HIPPOCRATES and HOFFMANN. In the cases of children, change to a dry situation, or to the sea-side, is especially beneficial. VAN SWIETEN (*Comment.* vol. iii. p. 436.) states, that several epileptics were cured by emigrating from Holland to the East Indies, and that, upon their returning to Europe, some experienced a relapse, but that others had recovered permanently. It is chiefly, however, in the asthenic and sympathetic forms of the disease, that change of air and travelling prove serviceable.

113. *Q. Regimen.*—In addition to what has been already advanced on this subject, the practitioner should bear in mind, that as much may be done by a regimen suited to the peculiarities of the case, as by medicinal agents. — *a.* The *meals* should be light, very moderate in quantity, at regular and not too long intervals between each. In the plethoric and more acute states, animal food should be altogether or nearly relinquished; but in the asthenic conditions, or when there appears to be a deficiency of blood, the more digestible kinds of animal food may be allowed once, and occasionally twice, a day. Even in these latter cases, a spare, but nutritious and digestible, diet ought to be adopted, as a liberal allowance will seldom be duly assimilated, and will only embarrass the digestive organs. The principal meal should be taken early, and a light supper, consisting of a biscuit and half a pint of milk, about an hour before retiring to rest. The only *drink*, in plethoric habits, should be water, or toast-water, or imperial; but in the opposite states, and in asthenic cases, Seltzer water, or even Pyrmont or Spa waters, with milk, may be allowed. Chocolate and cocoa are unsuited to the former class of cases; and coffee and green tea should be avoided, especially where active determination to the head is observed. Black tea once a day, and milk and water, are the best suited to the ordinary states of the disease. Not more than half a pint of any liquid should be taken at one time.

114. *b.* Epileptics should not *sleep* longer than seven hours. They ought to lie in an airy chamber, without curtains to the bed, and without night-caps; upon a hair mattress, with the head and shoulders somewhat raised. The hair ought to be worn closely cut, and in the severe sthenic cases should be shaved entirely off. The tepid or cold affusion on the head, or shower bath, should be used every morning, the scalp being afterwards well rubbed. In all cases, *early rising*, and *regular exercise* in the open air, should be enjoined. But the exercise should not be at one time, but twice or thrice daily, with intervals of repose. It should be taken on foot, and not sooner than two hours after a full meal. The patient should be as much as possible in the open air; but should not venture on horseback. Flannel ought to be worn next the skin, and the lower extremities constantly kept warm. During warm weather, a light-coloured hat should be worn; and ex-

posure to the sun's rays always avoided. When the attacks are at all frequent, the patient ought never to be without an attendant, and he should be guarded from the fire, from precipices and water. He ought not to frequent crowded assemblies, nor even the bustling and crowded streets of great cities, nor should he look down from precipitous places.—There is no disease that requires a more strict dominance of the passions and desires than this. The concluding injunctions of M. Borie's judicious treatment (see note to § 104.) especially require observance, as the habits there referred to have a powerful influence both in inducing and perpetuating the malady, and in destroying the constitutional and intellectual powers.

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EPISTAXIS. See Hæmorrhages.

ERECTILE TISSUE.

—Syn. *Vasa Erigentia; Tela Erectilis. Tissue Erectile*, Fr. *Erectiles Gewebe*, Ger.

Classif.—Pathology—*Morbid Structures.*

1. This structure, which is eminently vascular, and copiously supplied with organic or ganglial nerves, possesses, beyond all others, that vital property which is obscurely evinced by several other textures, and which was denominated the *turgor vitalis*, or vital turgescence, by Hebenstriet, Schlosser, Reil, and Ackermann. This property, whether denominated as above, or called vital expansion, or any other name, is more generally diffused, and presents more important relations, both in health and in disease, than has usually been acknowledged. The reader will find it more fully discussed under the article Turgescence. I have merely to notice in this place, very briefly, the morbid states, which the parts allowedly erectile present. These parts are—the cavernous and spongy body of the penis, as well as its bulb and gland; the clitoris and nymphæ; and the nipple of the female. There are other parts more obscurely (owing to their situation), but undoubtedly, endowed with this property: these are—the uterus, especially its neck; the Fallopian tubes, particularly the fimbriated extremities; the spleen; and the lips of both sexes: but these are not comprised in the following observations. The morbid structure called *Nævus maternus, Aneurism by Anastomosis* (Bell and Freer), *Angiectasia*, or *vasorum dilatatio* (Meckel), *Telangiectasis*, or *vasorum ultimorum distensio*, by some German authors, appears to be merely an accessory or morbid form of the erectile tissue; and I agree with Dr. Craigie, in considering that such is the case, and that the throbbing vascular tumour first noticed by Pearson, and subsequently minutely described by Scarpa, is an adventitious formation of the same kind.

2. The *erectile* tissue may evince its characteristic property in a very marked manner, and to an extent that is truly morbid, without any appreciable change in its organisation. This is shown in *priapism*, in which the vascular turgescence is the result merely of nervous excitement or irritation. *Chordee* is a modification of this state, caused chiefly by inflammation of an adjoining structure; the erectile tissue of the penis being excited, whilst the submucous tissue of the urethra is inflamed, and unyielding, owing to its morbid state, and to spasm of the *ischiocavernosus* muscle.

3. *Hæmorrhage* rarely takes place spontaneously in erectile tissues. I have, however, met with it in the *corpus cavernosum* of the penis, occasioning a state nearly resembling that of priapism, but unattended by nervous or mental excitement. In this case, the morbid state was removed by a small incision made into the cavernous structure, when grumous dark blood escaped. An interesting instance of this kind is recorded by Mr. Callaway. Similar changes are not so infrequent, from external violence, particularly in the erectile tissue of the female organs, owing to difficult or instrumental labours. This tissue may be the seat of excrescences, of scirrhus, and, like others, be involved in specific inflammation, malignant ulcerations, and adventitious formations; but such of these, which belong to the province of the physician, are noticed in the articles on the Spleen and Uterus.

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ERETHISM, and MERCURIAL ERETHISM.

Erethismus (ἐρεθισμὸς, from ερεθίζω, I excite or irritate.).

1. I. Erethism, in *Pathology*, has been generally understood, since the time of Hippocrates, as implying a state of irritation, or excitement of a part, different from, or short of, the inflammatory condition; although often passing into it. Hippocrates and Aretæus viewed it as irritation, accompanied with some degree of debility. Galen applied the term to irritation of the stomach and intestines by acrimonious fluids; and most of the ancients believed that, where it existed, it prevented the accession of salutary critical evacuations. Many modern pathologists employ it as synonymous with orgasm, or simply an exalted state of the vital actions of a part; and others attribute to it more of a morbid import, viewing it as an early stage, and lesser grade, of many acute diseases, especially those that are febrile or inflammatory. The most familiar illustration of this state, according to the

former class, is the act of blushing. According to the latter class, the ravenous appetite attendant sometimes upon debility and various affections of the digestive organs, proceeds from erethism of these parts, or, in other words, from an excited state of the nerves of the organ, with increased circulation and secretion or exhalation from the villous surface. It is very probable, that this state, either prolonged, or frequently excited, will give rise to acute or chronic inflammation, and even to changes of structure, and to effusion from mucous or serous surfaces. That it prevents the accession of critical changes, is also probable.

2. This condition should be viewed as morbid, and *treated* according to its seat and grade. It requires, generally, refrigerants, light or low diet, soothing and mucilaginous drinks, tepid or warm bathing, cooling diaphoretics and diuretics, and mild laxatives and enemata. When neglected, it is apt to extend the sphere of its morbid influence, more especially when seated in the digestive mucous surfaces; the functions of digestion, sanguifaction, and assimilation becoming disordered, and irritation supervening in the cutaneous surface, in the liver, and even in various remote parts. (See art. DISEASE, § 72. *et seq.* and 78. *et seq.*)

3. II. ERETHISM, MERCURIAL — *Erethismus Mercurialis* — was the name given by Mr. PEARSON to that extreme state of irritability and exhaustion which sometimes is occasioned by mercury. Before this state was described by this surgeon, its nature and cause had been entirely overlooked, although it must have often occurred, and even proved fatal. It evidently arises from the poisonous action of the preparations of mercury upon the organic nervous system and heart. The preparations which most commonly produce it, are, the blue pill and the ointment, particularly the latter; and it is not improbable that some change may take place in these from the action of the air, when they have been long kept, that will give rise to this affection, if they be prescribed in the quantities safely administered in the more recent state. A mercurial atmosphere, as in confined syphilitic wards, has also, very probably, a considerable share in its causation. The erethismal symptoms usually come on early in a mercurial course, but they may occur at any period. When once produced, they very readily return upon resuming the mercury, in the same form that first occasioned them. Pre-existing debility, the action of malaria, the scrofulous diathesis, constitutional susceptibility and irritability, and previous mental excitement and anxiety, seem to be, as far as is yet known, the chief predisposing causes.

4. i. This affection usually *commences* with slight trembling of the limbs and tongue, sense of fluttering in the chest, irregularity of the heart's action, and palpitations on the least exertion. The pulse is feeble, small, quick, compressible, irregular, or intermitting. The strength is extremely depressed, the countenance is pale and contracted; and great anxiety at the præcordia, with frequent sighing and a feeling of sinking, is complained of. If the mercury be still continued, the tremblings, the frequency, irregularity, and intermissions of the pulse, increase rapidly, and are attended by a sense of coldness, and sometimes by vomitings. At this period, sudden or great exertion may extinguish life.

5. ii. *The Treatment*, early in the affection, is generally easy and effectual. Upon the first indication of it, the patient should be removed to, and remain as much as possible in, the open air; and mercury, in every form, relinquished; even a mercurial atmosphere should be avoided. The preparations of ammonia and camphor ought to be given in full doses, and the surface of the body cleansed from all impurities, especially from the remains of mercurial ointment. Having thereby restored the state of the circulation, a course of nitric acid with sarsaparilla should be entered upon, and the bowels kept gently open by a sufficient dose of the precipitated sulphur taken at bedtime on alternate nights. If it should be still necessary to resume the use of mercury, as sometimes proves to be the case, the utmost circumspection is requisite. The oxymuriate, in the tincture of cinchona, or in the form of pill with the pulvis glycyrrhizæ and camphor, and taken with the meals, will often produce a sufficient salivation. After a most severe case of this affection which came under my care, where it was determined, in consultation, to have recourse to mercurial salivation as a last resource, for the cure of most dangerous secondary syphilis, the preparation prescribed in the manner now mentioned had the desired effect.

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ERGOTISM.—(CLASSIF. PATHOLOGY, *Ætiology.*) Diseased, unripe, or damaged grain of any kind, is injurious to the animal economy, according to the quantity consumed. The species of grain, the nature of its alteration from the wholesome state, and the proportion of it entering into the food of man and the lower animals, are the chief circumstances modifying the morbid results. *Rye* is most frequently productive of injurious effects in the northern countries of Europe, the disease in it giving rise to the *ergot*, or spur, being the chief cause. But wheat, rice, or any other grain, either similarly diseased, or prematurely cut down, or damaged by the mode of keeping, or by age, or mixed with the seeds of poisonous plants, as those of the *Raphania raphanistrum* and the *Lolium temulentum*, will occasion dangerous diseases. The noxious effects of spurred rye (*Secale cornutum*) have been most frequently observed, and are especially noticed in connection with the affections of which it is one of the chief causes. (See arts. GANGRENE, and SPASM — *Cachectic*.) But the disorders produced by other kinds of diseased or unwholesome grain, are in many respects similar to those consequent upon the use of spurred rye. Sufficient allusion has been made, in the article EPIDEMICS, to the influence of unripe, blighted, deficient, or damaged crops, upon the health of the community; the epidemics thereby occasioned, varying in character with the particular state on which the unwholesomeness of the grain depended, and the concomitance of other causes. The particular unwholesome condition of grain has not, however, been hitherto viewed sufficiently in connection with its specific effects upon the economy, in any one instance; and it is only in respect of spurred rye, that we have any kind of data that will admit of the special consideration of the subject. From some circumstances that have come before me, I should infer that unripe grain is productive chiefly of diarrhœa and dysentery; that diseased, impure, or blighted grain, most frequently occasions affections of the nervous and vascular systems, with disorder of the digestive organs, and contamination of the circulating fluids; and that damaged and old grain gives rise principally to fevers of a malignant or adynamic kind, with predominance of some one or more of the preceding affections, according to concurrent causes and circumstances. (See Disease — *Causation of*; Gangrene, and Spasm.)

ERYSIPELAS. Syn. — Ἐπιφλόγισμα, Hippocrates; *ἐρυσίπελας*, Gr. (from *παρὰ τὸ ἐρύεσθαι ἐπὶ τὸ πέλας*, that it extends to adjoining parts; or, rather, from *ἐρύω*, I draw, and *πέλας*, adjoining; or from *ἐρύθρος*, red, and *πελὸς*, brown, livid) *Ignis Sacer*, Lat. *Febris Erysipelatosa*, Sydenham, Schroeder, &c. *Febris Erysipelacea*, Hoffmann, Vogel, &c. *Rosa*, Sennert. *Ignis Sancti Antonii*, Auct. Var. *Emphlysis Erysipelas*, Good. *Erysipèle*, Fr. *Die Rose, der Rothlauf*, Germ. *Erisipela, Risipola*, Ital. *The Rose, St. Anthony's Fire.*

Classif. — 1. *Class*, Febrile Diseases; 3. *Order*, Eruptive Diseases (*Cullen*). 3. *Class*, Sanguineous Diseases; 3. *Order*, Eruptive Fevers (*Good*). 4. *Order*, Vesicular Eruptions (*Willan*). III. Class, III. Order (*Author*, in *Preface*).

1. Defin. — *Asthenic inflammation of the integuments, affecting them more or less deeply and extensively, with diffused tumefaction, and a disposition to spread, depending upon constitutional disorder.*

2. I. General Description. — *A. Erysipelas** usually *commences* with either the local or the constitutional symptoms more prominently marked; but I believe that the local symptoms never manifest themselves before some disorder referrible to the vital sources and centres has been present, although frequently in too slight a degree to alarm the patient or come before the physician. Previous to, or accompanying, a sense of tension, itching, heat, weight, and uneasiness, with diffused redness and swelling of the skin, the patient experiences chills, rigors, disturbance of the functions of the stomach and bowels, and a quickened circulation. On the second and third days, the swelling, which was either slight, or scarcely noticed, increases rapidly, extends superficially, and is warm, shining, of a yellowish red colour, disappearing momentarily during pressure, with a tensive burning pain, exacerbation of fever towards evening, and remissions in the morning. In addition to these, the patient complains of frontal headach, drowsiness, anxiety at the præcordia, general lassitude, and pain or aching of the limbs; anorexia, nausea, or vomiting; thirst, and heat or dryness of skin. The tongue is generally loaded, and subsequently dry; the bowels are constipated, and the motions offensive; the urine is turbid or saffron-coloured; and the pulse full, soft, frequent, sometimes broad and compressible, and often oppressed or irregular. The disease generally runs its course, in its more acute forms, between the seventh and fifteenth day. It is sometimes extended to the twenty-first, but seldom beyond, unless in cases of relapse or metastasis, or when it assumes certain anomalous forms, or occasions organic changes of subjacent or internal parts, which prolong the fever and increase the danger.

3. *B.* Erysipelas presents phenomena which are peculiar to it, and distinguish it from phlegmonous inflammation, on the one hand, and from the inflammatory action attendant on rheumatism and catarrh, on the other. — *a.* The characters of erysipelatous inflammation are as follow: — *α.* The *pain* is peculiar — is tensive, burning, or stinging; is not severe, but is diffused throughout the inflamed surface, and is occasionally remitting. — *β.* The *redness* is not intense, as in phlegmon; but is either pale, rose-coloured, or of a pale yellowish hue — arising, seemingly, from a more copious and diffuse deposition of serum, slightly tinged with a little blood. The redness always disappears on pressure, but quickly returns when pressure is removed: it is of a deeper red when the attendant febrile action is of a sthenic kind; and of a more livid hue when the vital powers are much reduced. — *γ. Tumefaction* is always present, and is sometimes very remarkable, owing to the effusion of serum into the subcutaneous cellular tissue. It is, however, diffused, never acuminated or convex; but sometimes hard or brawny, as in the sthenic or phlogistic variety; and occasionally soft and boggy, as in the œdematous or asthenic variety, or when the adjacent cellular tissue is affected or suppurating.

4. *b.* Erysipelas is *seated* chiefly in the integuments; but it presents various modifications, according as the more superficial or more internal tissues of the skin are especially diseased. Where the *cutis vera* is the principal seat, the cellular tissue underneath is also materially affected; it being usually infiltrated with serum, tumefied, and sometimes inflamed to a very considerable depth in some instances; whilst the more superficial capillaries likewise partake in the disturbance. Where, on the other hand, the *rete mucosum* and papillary tissue are the chief seat, the disease is commonly accompanied with vesication. When this occurs, or when a discharge from the surface, or free exfoliation of the cuticle, takes place, the severe affection of the subjacent cellular tissue very rarely is observed.

5. *c.* Erysipelatous inflammation has always a tendency to *spread to adjoining*, and occasionally even to *attack remote, parts*. As long as the metastasis, or vicarious affection of distant parts, is confined to the integuments, the primitive form and nature of erysipelas is retained; but, as soon as it has apparently attacked internal organs, which is sometimes the case, owing to their pre-existing disposition and morbid conditions, and to the operation of superadded causes, then the affection of the skin disappears, and the super-

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* Some confusion has arisen from the manner in which this disease and *erythema* have been viewed in relation to each other, and in which both have been classed. For, while I admit, with Dr. Good, that the term erysipelas has been loosely employed in medical writings, yet I conceive that it will not add to the precision of our knowledge to remove certain of the varieties of erysipelas to the genus erythema, where their local characters are chiefly considered, and their more important constitutional and vital relations are overlooked.

induced internal disease occasions the symptoms of an idiopathic malady, with more or less of the constitutional disturbance characterising the erysipelatous eruption, particularly those which relate to the vital energies and powers of resistance. Thus, inflammations of internal parts, as of the serous or mucous surfaces, may displace, or be vicarious of, the erysipelatous disease of the skin; but such inflammations will still retain peculiar features, and differ from idiopathic or true phlogosis of those parts; the depression of the powers of life, the morbid condition of the circulating fluids and of the excretions, characterising erysipelas, attending also upon them, often in increased grades.

6. *d.* Like other inflammations of membranous parts, erysipelas generally assumes an *acute form;* and, in this respect, resembles phlegmon: but differs from it very materially as regards the nature of the constitutional disorder, especially the morbid state of the circulating fluids and of the excretions, and the manner of termination — particularly the slow convalescence; the persistence of congestion — especially of the venous capillaries; the desquamation of the cuticle, and the tendency to relapse.

7. *e.* The characteristics of erysipelas arising from the *texture* in which it is seated, are — the dryness, the stinging heat, the peculiar shining appearance of the surface, the burning and itching, and the frequent elevation of the cuticle into vesicles, or its successive desquamation. All these indicate — 1st, suppression of transpiration, with increased circulation; 2d, morbid sensibility of the cutaneous nerves; 3d, a preternatural secretion of serum beneath the cuticle; and, 4th, an altered state of the reproductive or plastic function of the *rete mucosum.*

8. *f.* When erysipelas has once attacked the frame, there remains a certain morbid *diathesis,* disposing to renewed attacks at distant intervals. The same property is also evinced by several non-contagious affections of the skin; and is most probably owing to acquired constitutional disposition, or rather, to a weakened state of the digestive and excreting or alimentary organs — to a latent state of disorder arising out of the remote causes of the disease, and heightened or rendered more persistent by its attack.

9. *g.* The *causes* of this malady are frequently the same as those of low forms of fever, catarrh, and rheumatism; for, like them, it generally proceeds from peculiar states and vicissitudes of weather and of the atmosphere; especially cold, moist, miasmatous, and foul conditions of the air, acting upon a system already disposed to their influence by depression of vital power, or by the accumulation of morbid or effete matters in the circulation, owing to defective action of the excreting organs, to unwholesome diet and regimen, or to prolonged disorder of the prima via.

10. *h.* Erysipelas is generally preceded and accompanied by more or less *fever,* according to the situation of the part affected, the sensibility and irritability of the system, and the character of the prevailing epidemic constitution. It should never be considered apart from the attendant state of constitutional disturbance, — from the manifestations of vital power, and the conditions of the circulating fluids, and secretions, — of all which the local affection is merely an extensive and important effect; but one which reacts upon these states and conditions, whence it chiefly derived its origin, or at least its peculiar characters. The modifications of the attendant fever depend chiefly upon the constitution and pre-existing state of the assimilating and excreting organs, upon the prevailing epidemic influence, and upon the weather and season. Thus, the fever more commonly approaches the inflammatory type during cold and dry seasons, or in winter and spring; whilst the more adynamic forms, with predominance either of the gastric, bilious, or nervous states, are most frequent in summer and autumn.

11. II. PARTICULAR DESCRIPTION.—Erysipelas presents various modifications, according — 1st, to the part affected; 2d, to the nature and form of the local changes; 3d, to the states of constitutional disturbance with which these changes are associated, and on which they are dependent; and, 4th, to the causes which have produced it.

12. *A. Modifications as to the part affected.* — The sensibility of the part in health, and its vital relations, especially modify the consentaneous disturbances of the sensiferous and vital functions generally characterising this malady. If it attack the *face,* commencing in one cheek, it generally soon extends to the other; and in a short time to the forehead and scalp, producing more tumefaction than almost in any other situation, owing to the effusion of serum in the subcutaneous cellular tissue. The eyes are closed or prominent; the nose is distended; the ears are red, shining, and burning. On the second or third day, the whole head and face are often enormously distended, presenting a yellowish or sub-livid redness. — Also, when the disease commences in the *scalp,* owing to punctures, bruises, or contused wounds, the affection of the subcutaneous cellular tissue is very great, frequently followed by diffused suppuration, and disease of the fibrous tissues adjoining. But, whether originating in the face or in the scalp, the greater the extent and intensity of the affection of these parts, the more are the functions of the brain, of the circulation, and of secretion disturbed. Hence the violent headach, tinnitus aurium, delirium, sopor, convulsions, coma, &c.; the parched and dark tongue; the morbid state of the evacuations; and the disturbance of respiration.

13. When erysipelas attacks the face, it sometimes affects the *mouth and fauces,* extending in some instances to the *pharynx* and *larynx,* internally, and down the neck to the chest externally. An interesting case of this kind was attended lately by Mr. BYAM and myself, where the enormous tumefaction of the neck and throat, with the affection of the larynx and trachea, increased by the constriction produced by the integuments surrounding the neck and throat, caused suffocation in a few hours. This extension of the disease to the fauces and throat, not infrequently occasions a species of consecutive *croup,* as stated in that article (§ 18. *d.*): it may also occur, when the scalp is affected; but, in this case, the disease generally extends down the neck and back, even to the loins. The disposition to spread thus extensively, and to affect subjacent parts, is most remarkable when the pulse is frequent, and vascular action greatly excited, at the same time that vital power is much depressed, the functions of excretion impeded, and the blood morbid

14. In other parts of the body, the symptoms are generally not so severe. The pain, however, is very great when the disease attacks the *mammæ* during lactation, or when it extends to the *organs of generation*. In these situations, it frequently implicates the subcutaneous cellular tissue and adjoining glands, and thus closely approximates in seat and nature to the primary form of spreading inflammation of the cellular tissue. When it occurs in the latter situation, in children between one and six years of age, it often proves fatal, either from this circumstance, or from sloughing ulceration. Where the extremities only are affected, there are generally less pain and constitutional disturbance than in other cases.

15. *B. Modifications of the local affection.*— The changes which take place in the external seat of disease, may be classed under four varieties: the glabrous, vesicular, crustaceous, and deep-seated.— *a.* The *glabrous* local affection consists in a diffused or plane and smooth tumefaction of the skin, of a rose or yellowish redness, sometimes verging to a sub-livid hue.—*b.* The *vesicular* form is attended with bullæ, or blisters, in parts of the inflamed surface, resembling the vesicles raised by cantharides. Sometimes they are numerous, small, and discrete *phlyctenæ;* at other times confluent, and forming very large *bullæ*, containing a yellowish, sometimes dark, sanguineous, acrid serum, effused between the rete mucosum and cuticle, which it elevates. These vesicles continue to appear during the course of the disease; are accompanied by an unpleasant tension, itching, burning, or pain; and, instead of diminishing, often increase, the inflammation and fever.—*c.* The *crustaceous* form arises from an early rupture of the cuticle, and escape of the lymphatic serum effused beneath it, which exposure to the air forms into crusts, and under which an acrid fluid collects, and irritates, or even ulcerates, the skin.—*d.* In the *deep-seated* and *tumefied*, the cellular and other subcutaneous tissues are affected, either by œdema, or by phlegmonous or diffusive inflammation, tending to disorganisation. Whilst the superficial parts of the integuments are the chief seat of the affection, in the preceding varieties, the tissues underneath are principally diseased in this, particularly the cellular and adipose; and they present every shade of morbid action, from simple passive œdema, to inordinate vascular excitement—from the lowest state of asthenia, to the highest degree of vital action—either passing rapidly into suppuration, or into disorganisation, or spreading extensively in the course of the cellular tissue, and involving other adjoining parts, as shown in the article on *Diffusive Inflammation of this Tissue.* It is generally observed in this associated or deep-seated malady, that the skin is but slightly altered, or that the morbid action in it diminishes, as that in the subjacent parts increase, especially if the latter be of a diffusive or septic kind.

16. *C. Modifications connected with the constitutional disturbance.*—The forms which the disease assumes, chiefly result from the states of the nervous system, of the assimilating and excreting organs, and of the circulating fluids, and from the temperament and habit of body. These modify the febrile action as well as the local affection, aided by the existing grades of constitutional power and vital resistance. Erysipelas consequently presents every intermediate shade between high vascular action with simply diminished vital power, and low vascular action with great depression of the vital energies, as respects both the part chiefly diseased, and the system in general.—*a.* As soon as the morbid action in the skin passes a certain height, it generally extends to the subjacent cellular tissue; and if it occur in young, robust, or plethoric subjects, or if the constitutional powers be not much reduced, or the nervous system not materially exhausted or oppressed; or if the functions of the digestive and excreting organs be not altogether overpowered; then the disease assumes more or less of the *sthenic* or *phlegmonous* character, both as to its local appearance and the attendant fever, and has a marked tendency to pass into suppuration, occasionally with destruction of the subcutaneous cellular and adipose tissues.—*b.* When the disease is attended by signs of accumulated sordes in the prima via, with nausea and vomiting, and a morbid state of the secretions, particularly of the biliary secretion,—characters which it often presents,—it has received, from Continental pathologists, the appellation of *gastric* or *bilious erysipelas.*—*c.* If it present great depression or disturbance, especially of the cerebro-spinal nervous functions, with a pale, evanescent, and changeable state of the part affected, and imperfect secretion and excretion; and if delirium coma, subsultus, &c. supervene; or if the local affection spreads rapidly, or if it entirely disappears, and is followed by internal disease; it has been called *nervous erysipelas*, or it may be said to be complicated with febrile disturbance of the nervous kind.—*d.* If, owing either to excessive morbid action over vital power, or to a faulty state of the system at the time of attack, or when it supervenes upon remittent or continued fevers, or upon any cachectic malady, or in aged or broken-down constitutions, it extends to the subcutaneous structures, and gives rise to œdema, or terminate in softening or disorganisation of these parts, it has received the name of *œdematous, septic,* or *gangrenous erysipelas.* This state of the malady is generally connected with defective assimilation and excretion, with an impure state of the circulating fluid, and with deficient vital power.

17. *D. The causes which dispose to, or excite, the disease,* have also great influence in modifying its characters, both local and general. When propagated by infection, it is prone to assume a complicated state, or to be associated with inflammation of the throat and pharynx of a most dangerous character, owing to its disposition to spread to the larynx and trachea; and with diffuse and gangrenous inflammation of the subcutaneous cellular tissue. A similar complication is also observed during certain epidemic constitutions, or when the disease has been occasioned by the contact of animal matters in a state of decomposition, or by other septic agents. In these cases, the tumefaction is often great; and, although vascular excitement may be very remarkable, vital power is much depressed, and speedily overwhelmed; owing chiefly to the morbid state of the circulating fluids, or to the contaminating and septic operation of these causes.

18. III. DIVISION OF ERYSIPELAS. — This disease has been divided by authors, according to its various states, into *febrile* and *non-febrile;*

the *stationary* and the *erratic*; the *benign* and *malignant*; the *acute* and *chronic*; the *periodic* or *habitual*, and the *accidental*; the *sporadic* and *epidemic*; the *idiopathic* and *symptomatic*; and the *primary* and *secondary*: to which may be added, the *internal* and *external*. As to all these general divisions, it is only necessary to remark that, by *Idiopathic* erysipelas is understood that condition of the disease which arises from the direct impression of the causes on the skin, as from vicissitudes and epidemic states of the air, chemical stimuli, morbid effluvia, poisonous matters, &c.; and by *Symptomatic*, is meant the external manifestation of internal disorder, as of impeded secretion and excretion, the accumulation of morbid excretions in the *primæ viæ*, and an impure state of the circulating fluid, either from interrupted elimination of effete matters, or from the absorption of morbid matters. As to the existence of *Internal erysipelas*, I may observe, that it cannot be allowed otherwise, than that inflammatory metastasis to internal organs, particularly the mucous and serous membranes, occasionally occur; the internal disease taking place either in consequence of the suppression or disappearance of the external affection; or the latter ceasing to exist, owing to the commencement or progress of the former. But, although the internal disease may retain the constitutional peculiarities attendant on the primary affection, yet its distinctive characters can no longer exist when it attacks a differently organised structure, from that to which they are chiefly owing. It is in such circumstances, and when internal inflammations supervene in broken-down constitutions, or from interrupted excretion and a morbid condition of the circulating fluids, as in the course of fevers, and in the puerperal state, that J. P. Frank and many other writers contend for internal erysipelas; similarity of morbid action, local and constitutional, although affecting different structures, being considered by them as sufficient to warrant the appellation.

19. The *Division* adopted by Willan and Bateman — viz. 1. *Phlegmonous*; 2. *Œdematous*; 3. *Gangrenous*; and 4. *Erratic* — is faulty, inasmuch as the termination in gangrene is peculiar to no one state, but may occur in either the first or second variety. — Dr. Good associates certain varieties of erysipelas, with *chilblain* and *intertrigo*, under the generic term of *erythema*. — Biett, Cazenave, and Schedel treat only of the *True* and *Phlegmonoid*. — One of the best and simplest divisions is by MM. Alibert and Rayer, into (*a*) the *Simple*, (*b*) the *Phlegmonous*, and (*c*) the *Œdematous*; but it is defective, as it excludes certain states or complications which should not be overlooked, when treating of this disease. — Mr. James adopts a nearly similar arrangement, substituting merely the term *superficial*, for that of simple, employed by Rayer.*

i. Simple Erysipelas — *E. Simplex* — *E. Exanthematicum* (Rust). — *Febris Erysipelatosa* (Sydenham, Hildenbrand). — *E. Superficiale* (James). — *E. Verum seu Legitimum* (Naumann).

20. Charact. — *Spreading inflammation of the skin, with soft and slight tumefaction, redness, stinging heat, fever, and frequently with vesication.*

21. *A.* The *mild*, benign, or superficial form, is attended by little constitutional disturbance, or only by slight inflammatory fever, or disorder of the digestive organs; the surface of the skin is of a pale or rose red; vesication very seldom, or sparingly, occurs; and occasionally, after spreading to, or affecting, adjoining parts of the surface, and disappearing from those in which it first commenced, it *terminates* in resolution in the course of a few days, especially after the disorder of the digestive and excreting organs, on which it is usually dependent, has been removed.

22. *B.* The *acute states* are attended by more severe local and constitutional symptoms (§ 2.). They are preceded by marked disorder of the secreting and excreting functions, and are accompanied by smart febrile action. The skin is generally red, hot, diffusely tumefied, and covered with small vesicles, and, in various parts, with large bullæ. These generally break soon after their appearance, or about the fifth or sixth day of the disease, the fluid drying into crusts of varying colour and thickness; the surface underneath either healing rapidly, or becoming excoriated by the acrid serum effused beneath them. In this latter case, the duration of the disease is longer, and the subsidence of the symptoms more gradual, than in the former.

23. *C.* The *termination*, which is usually by resolution, is preceded by a mitigation of the symptoms, after having continued in full force for three, four, or five days; and is attended by exfoliation of the cuticle and of the crusts; resolution generally taking place more rapidly in this, than in any other, disease of the integuments. But sometimes the sudden disappearance of the inflammation is followed by its supervention in some other part of the external surface — *Erratic Erysipelas*; and more rarely by asthenic inflammation of some internal part — *Metastatic Erysipelas*. These occurrences are most frequent when the local affection suddenly subsides, although the constitutional disturbance continues, and effete or morbid matters are still retained. The evacuation of copious offensive stools, or of urine depositing a large sediment, antecedently to, or about the time of, the disappearance of the local affection, is a sure indication of a salutary crisis.

ii. Complicated Erysipelas — *E. Complicatum*.

24. Charact. — *The inflammation of the integuments of the kind above defined* (§ 1. 15.), *associated with disease of the adjoining structures, or with prominent disorder of internal organs.*

25. This species is very varied, owing to circumstances already enumerated, but chiefly to the severity of the attack, to its situation, to the states of the internal functions and of the constitutional powers, and to the exciting causes. Indeed, these latter circumstances mainly determine the character of the former. The morbid

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* *Synopsis of the Arrangement of different States of Erysipelas adopted by the Author.*

Species I. — Simple Erysipelas; *E. Simplex.*
Var. A. — *Benign or Superficial Erysipelas;* E. Simplex Benignum.
Var. B. — *Acute Erysipelas;* E. Simplex Acutum.
Species II. — Complicated Erysipelas; *E. Complicatum.*
Var. A. — With *Œdema* of the Subcutaneous Cellular Tissue.
Var. B. — With *Inflammation* of the subjacent Parts.
Var. C. — With *Inflammatory Disease* of the Throat, &c.
Var. D. — With *Nervous* or *Cephalic Affection.*
Var. E. — With *Gastric* or *Bilious Disorder.*

associations, or more complicated states and severe degrees, of erysipelas, are those in which adjoining tissues suffer, or internal organs are disordered, at the same time that the pathognomonic phenomena — the inflammation of the integuments — continue manifest. For, although metastasis to internal viscera, or the inflammation of other parts than of the skin, occurring in cachectic habits, or in those who are subject to this disease, may, with great propriety, be viewed as erysipelatous, as respects the nature of the attendant constitutional affection, yet neither of them can strictly be considered as such, as regards the part affected. The erysipelatous character, however, of the affection, under both circumstances, should not be overlooked; as thereupon ought to depend, in a great measure, the choice of remedies.

26. *A. With Œdema, or Effusion into the Subcutaneous Tissues — E. Œdematodes* of authors. — *a.* This state of the disease may be consecutive of the simple varieties, or it may accompany them from the commencement, when they attack the face, or the vicinity of the organs of generation; effusion, in these cases, always taking place in the loose cellular tissue. It often, also, supervenes in the progress of anasarcous swellings. Its primary form occurs chiefly in old persons, and broken-down constitutions, consecutively of chronic visceral disease, and in the leucophlegmatic and dropsical diatheses; the affection of the skin and subjacent cellular tissue being nearly coëtaneous. The external surface is of a pale or yellowish red, inclining to brown; generally smooth and glossy; and it is seldom tense. It is but slightly hot or painful; and sometimes neither the one nor the other. The swelling increases gradually, extends slowly, and pits slightly on pressure. Vesications are not common; and the vesicles, which are small, numerous, and flattened, usually appear from the third to the fifth day; they break in a day or two, and are replaced by thin crusts. In the more active states, a sero-puriform, or puriform, fluid infiltrates the cellular tissue, or is discharged from the vesicated surface. The genitals, the face and scalp, the thighs and legs, are chiefly the seat of this variety. Dropsical limbs, especially when the cuticle is cracked or abraded, or after scarifications have been made in them, are often affected by it; and, in these circumstances, there is a marked disposition to gangrene.

27. *b.* Œdematous erysipelas *terminates* — 1st, in resolution, with absorption of the effused fluid; 2d, in suppuration; and, 3d, in softening, sloughing, and gangrenous destruction of the part. — *Suppuration* occasionally takes place; but is generally of an irregular or diffusive kind, extending in the course of the vessels, and between tendons and muscles; is preceded by a boggy state of the swelling; and is often attended by disorganisation of portions of the cellular membrane. — *Gangrene* is indicated by severe pain; and a red and glossy state of the surface, passing into a livid or leaden hue.

28. *B. With Inflammation of the Subcutaneous Structures — Er. Phlegmonosum* vel *Phlegmonodes*, Auct. var.; *Diffuse Phlegmon*, Dupuytren; *Er. Spurium, Pseudo-Erysipelas*, Rust. — This is a most important and often dangerous disease; especially when epidemic, or propagated by infection. It is very varied in form and seat; and presents every grade of activity, from the passive or œdematous state, just described, to the most acute grades that rapidly pass into gangrene (§ 31.). — When it occurs *sporadically*, its local character is that of "diffused phlegmon;" the attendant fever being of an inflammatory kind, and preceded by rigors. In this case, vascular action is more acute; the swelling is greater and more circumscribed; the pain and burning more remarkable, and more pulsating; the redness deeper; the temperature higher; and the disposition to pass into suppuration greater, but to change its situation less, than in other circumstances. Where the symptoms are very acute, the subjacent cellular and adipose tissue frequently are profoundly affected; the fasciæ, the intermuscular substance, and even the fibrous structures, becoming inflamed. In such cases, disorganisation of the cellular and adipose tissues often rapidly supervenes; the part passes from a *brawny* and tumefied, to a flaccid and *boggy*, state; and the attendant fever changes to a low or adynamic form. When occurring *epidemically*, or from infection, the local and constitutional symptoms are more severe; vital power and resistance are diminished; and the disease is often complicated with a very dangerous affection of the throat and adjoining parts. This variety may be divided, as suggested by M. Rayer, into *three grades*.

29. *a.* In the *first*, after rigors, and in connection with the constitutional symptoms described above (§ 2.), tingling, heat, and redness, followed by hard tumefaction of the part, begin to appear. A stinging pain, tension, and burning heat are complained of in the seat of swelling; which is diffused, hard, and deep-seated. After pressing the surface with the finger, the redness returns more slowly than in the superficial and simple disease. The lymphatic glands often become inflamed or enlarged; and febrile action is fully developed. If, about the fifth or sixth day, the skin be less red and tense, or covered by furfuraceous scales, and the swelling subsides, *resolution* has commenced. *Œdema* of the cellular tissue, however, sometimes remains for two or three days. But if the pain, about this period, become pulsating, *suppuration* in one or more parts is inevitable. The abscesses thus formed generally give issue to well-digested pus, and heal in a few days.

30. *b.* In the *second grade* of this variety, inflammation is more extensive; and the redness, heat, pain, and fever are greater. If the disease be not arrested, abscesses form, very insidiously, from the sixth to the ninth day, or even earlier; or a sero-puriform fluid infiltrates the cellular tissue, extending between the muscles and under the integuments; and, upon free openings being made, disorganised portions of this tissue are discharged with the puriform or ichorous matter. Fistulous cavities frequently are formed, giving issue to a fœtid and ichorous pus. — Sometimes the skin is thinned or detached, and falls within the margin of the ulceration (Rayer). In these cases, the stomach and bowels frequently become irritable; and the patient dies, either from the exhaustion occasioned by diarrhœa, or by the extensive suppuration and disorganisation of the cellular tissue; or from the absorption of the morbid

secretion of the part, and the consequent contamination of the circulating fluids; or from those causes combined: severe nervous symptoms (§ 35.) being either superadded, or taking the place of this disorder of the prima via.

31. *c.* The *third grade* presents a still more acute series of symptoms. In two or three days, the inflammation of both skin and subjacent parts reaches its acmé. The skin is tense, smooth, and shining; and of a deep or dusky red, which is hardly a moment dissipated by the pressure of the finger. The swelling is profound, very painful, intolerant of pressure, and diffused. In this grade, and sometimes also in the preceding, the inflammation extends to, and beneath, aponeurotic expansions; and, occasionally, even to the periosteum, especially when the head is affected. The pulse is sharp and frequent; the tongue is loaded and furred; and the excretions are offensive. There are, also, great thirst, restlessness, sleeplessness, increased fever towards night, and delirium. About the fifth or sixth day, the inflamed integuments assume a violet hue, lose their sensibility, are softened, and covered by phlyctenæ filled with a reddish serum. Soon afterwards, ecchymoses and sloughs form; and, at the same time, an ichorous suppuration, with destruction of the cellular tissue, is established in the subjacent parts — *Gangrenous Erysipelas.* In favourable circumstances, the sloughs are detached, and the parts beneath assume a healthy character; but more frequently the patient sinks, from the absorption of morbid matter causing contamination of the fluids, or inflammation of veins; with affections of the brain, of the stomach, and of the bowels, as in the more severe forms of adynamic fever.

32. *d.* The *first* and *second grades* of this variety often occur in the scalp, face, and neck; and are frequently further complicated with cerebral affection, especially delirium, coma, &c.; or with gastric and bilious disorder; and with inflammation of the fauces and throat. The *third grade,* as well as the first and second, is met with chiefly in the extremities, particularly after contusions, fractures, and punctured wounds, and is seldom preceded or attended by rigors. When occurring epidemically, as from infection, the constitutional disturbance is greater and more dangerous; the pulse weaker and more frequent; the inflammation of the skin generally less, and that of the cellular tissue more remarkable, and more nearly approaching, if not altogether identical with, *diffusive inflammation* of that tissue (see this article), than in other circumstances.

33. *C. With severe inflammatory Affection of the Throat and Larynx.*—This affection may accompany any of the forms of erysipelas attacking the face; but it is most frequent in the phlegmonous variety, particularly when it appears epidemically, or from infection. Of this, the papers of Dr. Stevenson, Mr. Arnott, Dr. Gibson, and Dr. M'Dowel, furnish interesting illustrations. In some cases, the extension of the disease over the nostrils and lips, to the fauces and pharynx, may be traced. In others, the affections of the throat and face are almost coëtaneous; and, in the more severe cases, the face, throat, and integuments, down to the chest, with the cellular substance underneath, and surrounding the pharynx, trachea, and glands, are more or less inflamed, infiltrated, and tumefied. Most commonly, the inflammation commences, with or after rigors, in the fauces or pharynx; is of a dusky hue; extends along the nasal surfaces, and affects the face, scalp, &c. A sero-albuminous exudation is either partially or rarely seen; the croupy symptoms, which sometimes supervene upon this complication, being owing rather to the extension of the inflammation to the mucous surface of the larynx and trachea, and the infiltration of the subjacent and surrounding cellular substance, than to the exudation of lymph. In a few cases of the complication — one of them in the practice of my friend Mr. Byam, at the time of writing this — the cellular tissue of the throat, and of the whole neck, was so distended, that the integuments appeared girt around them with the utmost tension; and, in this instance especially, the respiration and cough were as distinctly croupal as in idiopathic croup. I have seen, in some cases of this kind, the constriction of the integuments so great, that incisions of them — as first recommended by Mr. Copland Hutchison —were required, to arrest fatal cerebral congestion or immediate strangulation. The constitutional disturbance in this state of disease is most acute; and, at the commencement, attended by high action, with deficient power. As the disease proceeds, the pulse becomes more and more frequent, unequal, irregular, soft, or small; deglutition difficult or impossible; respiration sometimes suffocative, wheezing, or sonorous and croupal, with strangulating cough; and the excretions are always foul, morbid, and offensive. Delirium, coma, or sinking, preceded by restlessness and anxiety, or disorder of the alimentary canal, are also generally observed.

34. This complication may *terminate,* in the most acute cases, in the course of three or four days — 1st, in suffocation, from the extension of the disease to the larynx and trachea, or from the inflammation, infiltration, and tumefaction of the cellular tissue surrounding these parts; — 2d, in sphacelation; — 3d, from the severity of the superinduced cerebral affection, in connection, sometimes, with congestion of the lungs; — and, 4th, the symptoms may abate under very decided treatment; and, as in the less severe cases, may pass on to resolution, or to the formation of purulent collections, either near the eyes, or about the angle of the lower jaw, or side of the neck. The formation of matter is generally insidious; this fluid being diffused throughout the cellular tissue, and frequently deep-seated. When this is the case, the result is usually fatal; owing to the partial absorption of the matter, and to the effects caused by it on important parts in the vicinity.

35. *D. With Nervous or Cephalic Affection — Erysipelas Nervosum,* of authors. — This is a common complication, where the disease affects the face or scalp, particularly the cellular substance surrounding the eyes (Piorry); occurring generally between the third and sixth days; and in the course of other varieties, attacking persons of weak constitutions and susceptible nervous systems, especially when about to pass into dangerous exhaustion, or gangrene, or prevailing epidemically. In the former circumstance, there is evidently superinduced inflammatory irritation, or excited vascular action, in the mem-

branes of the brain, analogous to the vascular excitement of the skin, often occasioning an increased exhalation of serum: hence the delirium, passing frequently into coma. In the latter circumstance, the cerebral disturbance is the result rather of depressed vital power, manifested especially in the cerebral functions, and of the morbid changes in the blood, than of inflammatory action. The pulse is frequent, but variable as to fulness and power. The tongue is at first loaded, red at the point and edges, and afterwards dry in the middle, and of a brown or dusky hue. The excretions are suppressed or impeded; and, in the worst cases, particularly towards the close, are passed unconsciously. Tremors, subsultus of the tendons, floccitation, &c. are then also observed. A fatal termination occurs generally from the seventh to the fourteenth day, or later. A bilious diarrhœa, or copious fæculent and offensive stools; a free discharge of urine depositing a copious sediment; and a general, warm, and copious perspiration; are favourable occurrences.

36. *E. With Gastric and Bilious Disorder.*— The bilious nature of erysipelas was strenuously insisted on by STOLL, DESSAULT, and others. Antecedent disorder of the digestive and assimilating organs is more or less evident in all the varieties, but especially in this; which is of common occurrence during summer and autumn, when the digestive mucous surface and biliary apparatus are most liable to be diseased. It is generally attended by manifest signs of accumulated sordes and morbid secretions in the prima via, and of an increased secretion of acrid bile, especially when the disease is epidemic at the seasons just mentioned.

37. *F.* Erysipelas may, moreover, be complicated with inflammatory action of the mucous surfaces, analogous to that of the skin, giving rise to a form of *bronchitis* or *gastritis*. Where it is connected with inflammatory sore throat, it sometimes extends along either the trachea, or the œsophagus, or even both, until the lungs, or the stomach and bowels, are affected; and, occasionally, along the Eustachian tube, to the ear: it thus becoming complicated with one, or even more, of these affections. This connection, first distinctly pointed out by J. P. FRANK, has more recently been insisted upon by BROUSSAIS, ELLIOTSON, and others. FRANK alludes to instances in which erysipelatous inflammation extended from the pudenda, along the vagina, to the uterus, and even to the bladder. Erysipelas may be further complicated with *inflammation of the lymphatics*, particularly when caused by breach of surface; or with *phlebitis*, when consequent upon injury, or when it has proceeded to suppuration.

38. *G.* Erysipelas may occur in the course of continued and remittent fevers; and it may appear during convalescence from any of the exanthematæ. In the first of these associations, it generally presents an adynamic character, with nervous or with malignant symptoms; frequently attacks the face, throat, and scalp; or the parts pressed upon in bed, or irritated by the evacuations; and is especially disposed to gangrene. When it supervenes upon remittents, it often assumes a bilious or gastric form; and in these, as well as in exanthematous fevers, it may prove a salutary crisis, if the pulse do not rise in frequency; and if the cerebral functions remain undisturbed. In crowded sick wards, and in lying-in hospitals, it often occurs in the progress of other diseases, with which it consequently becomes complicated. But it is a most dangerous circumstance; as it is, in those cases, caused by an infected or impure air, which, favoured by the depressed state of vital power, or by imperfect excretion, has contaminated the circulating and secreted fluids.

39. IV. LESIONS IN FATAL CASES.—When the cellular tissue has not been severely affected, the injection of the integuments subsides considerably after death; and hence the redness of the external surface, as well as that of the throat, has often nearly or altogether disappeared. In addition to infiltration of the subcutaneous tissues with serum, or a sero-puriform matter, and occasional disorganisation or gangrene of these and of the integuments, various internal lesions are commonly observed. The *blood* in the large vessels and cavities of the heart is frequently semifluid; and the *veins* proceeding from the part chiefly affected, are often inflamed, or contain pus; as first observed by M. RIBES, and confirmed by MM. DANCE, ARNOTT, and by my own observations, especially when the disease has been complicated with diffuse suppuration of adjoining cellular parts. In cases that have been attended by cephalic affection, the membranes of the *brain* are sometimes injected, or inflamed, and the arachnoid opaque, with serum effused between them, and in the ventricles; but, as M. PIORRY has shown, these lesions are often not observed in this complication. Where the throat has been affected, the *fauces*, *pharynx*, and *œsophagus* are of a dark or dusky red, or of a livid or brown tint; much softened, sometimes with small patches of dark lymph on their surfaces; and the subjacent tissues infiltrated with a bloody serum, or with a sero-puriform matter. These appearances occasionally extend to the *larynx* and *trachea*, the submucous tissues being œdematous, or infiltrated with similar fluids.—In cases that have been associated with bronchial or pulmonary disorder, the *lungs* are congested with a dark semifluid blood; the *bronchi* are of a dark red or brown colour, are injected, and often contain a frothy and bloody fluid; portions of the lungs being œdematous, and others partially hepatised.—The mucous surface of the *stomach* and *intestines* is generally injected, of a deep or dark colour, often softened, and, where the bowels had been much affected, abraded, or inflamed, especially in the cæcum and rectum. The *liver* and *spleen* are seldom found in a healthy state, particularly in persons advanced in age; but they present no lesions peculiar to this complaint, excepting that those usually resulting from intemperance are most frequently observed.

39. V. DIAGNOSIS.—The antecedent constitutional disturbance, with excited vascular action and drowsiness;—the dull or yellowish red, or rose-colour, of the integuments, terminating in an irregular but well-defined margin, and disappearing, momentarily, on pressure;—the pricking, stinging, and burning heat and pain of the part, sometimes with irregular vesications;—the slight, plane, and diffused tumefaction, or the greater swelling and diffused affection of the cellular tissue in connection with the inflammation of the

skin; — its rapid extension, or delitescence, or change of situation; — its almost uniformly acute or subacute character, as respects both the local and constitutional symptoms; — its manifest association with disorder of internal organs, particularly of the digestive, assimilative, and excreting viscera, and of the brain and membranes; and its dependence upon a change in the circulating fluids; — its indisposition, owing to the states of vascular action and of the fluids, to confine or limit itself; and the inability of forming coagulable lymph, owing to these causes; — its infectious character under circumstances favourable to the manifestation of this property, more especially when the constitutional affection is of an adynamic kind, or when attended by sore throat; — the readiness with which it is repelled, and thrown in upon vital or important viscera; — its rapid termination in, or transition to, resolution and desquamation, or suppuration, or gangrene; — and, finally, the insidious and diffused manner in which purulent matter forms in the cellular tissue, when suppuration takes place; — are sufficient to distinguish the disease from *erythema* on the one hand, and from *phlegmon* on the other.

40. VI. PROGNOSIS. — There are various circumstances which should influence our opinion as to results, in this disease; and determine us to give a guarded prognosis on all occasions: — 1st, Its tendency to *relapse* or to recur, from slight or unappreciable causes, or from errors in diet, &c.; — 2d, Its disposition to become *associated* with severe or dangerous internal affections; to disappear suddenly, and to be succeeded by them, especially diseases of the brain and its membranes, of the air-passages and lungs, of the digestive canal and peritoneum, and of the veins; — 3d, The age, habits, and previous health of the patient; — 4th, The causes which produce it, and the character of the prevailing epidemic; — 5th, The parts which it attacks, its particular form and complication, and the state of constitutional disorder accompanying it.

41. *a.* Recollecting that erysipelas is the external expression of an internal or constitutional disease, we should consider the free manifestation of it on the external surface, with little or no affection of the subjacent or internal parts, and without any remarkable depression of vital power, as a *favourable* circumstance, and not to be impeded by external means. As long as it remains thus *simple* and superficial, and of neither a deep, fiery, nor purple colour, although it may be extensive, and attended by vesication, it is not dangerous; unless it affect the face and head, and be accompanied with cerebral disorder. If it follow the stings of insects, the application of acrid substances to the skin, or external injuries, it is seldom attended by danger, unless in cachectic or aged persons, or those addicted to the use of spirituous liquors. Stationary superficial erysipelas is less to be dreaded than the erratic; for, in the latter, there is greater risk of internal metastasis; and the erratic character is often connected with serious changes in the nervous and vascular functions, or with latent internal disorder.

42. *b.* The risk of an *unfavourable issue* is generally great in proportion to the severity of the constitutional affection, — to the adynamic or nervous character of the attendant fever, — to the depravation of the circulating and excreted fluids, — to the deepness and darkness of the colour of the affected part, — to the severity of the cephalic disturbance, — to the extent and diffusive form of the inflammation and suppuration in the subcutaneous tissues, — and to the vital importance of the parts prominently associated in the malady. Great tumefaction of the throat, scalp, or face, with prominence of the eyeballs; attendant disease of the fauces and pharynx, or of the respiratory passages and lungs, or of the stomach, intestines, &c.; tenderness at the epigastrium, or over the abdomen; the disappearance of the external inflammation, and supervention of either of these, or of some other malady; and coma, jactitation, unconscious evacuations, &c.; are dangerous occurrences. The frequent or habitual recurrence of erysipelas, particularly in persons advanced in life, indicates organic change in the liver; and its appearance about the organs of generation, in them, and in children, and around the umbilicus of infants, or in œdematous and dropsical limbs, especially after scarifications, is very unfavourable. A similar inference may be drawn when it attacks the face and scalp, particularly of delicate, aged, or broken-down subjects; or follows severe injuries or surgical operations; or appears during convalescence from dangerous maladies, and when it is not preceded nor attended by shivering. Epidemic erysipelas, particularly in the crowded wards of hospitals, and during cold and humid states of the air, is attended by greater risk than sporadic cases.

43. VII. CAUSES. — *A.* There frequently exists a peculiar *predisposition*, or an erysipelatous diathesis, the nature of which has not been fully ascertained. It seems, however, to be connected with great irritability or tenderness of the cutaneous surface, and defective power of the capillary vessels and secreting surfaces and viscera. Females are much more *predisposed* than males, particularly at the period of menstruation, and after the epoch of its termination. The irritable, bilious, and phlogistic temperaments; feeble, leucophlegmatic, and plethoric habits; the gouty diathesis; the autumnal, winter, and spring seasons; torpor or interruption of the biliary functions; an habitually acrid and fœtid perspiration; unwholesome and low diet; addiction to spirituous liquors; pre-existing visceral disease, general cachexia, and exhaustion of vital or constitutional power; are the chief predisposing causes. J. FRANK supposes that young persons and females are most subject to erysipelas of the face and head; and the aged, to that of the extremities. Certain parts are more predisposed than others; as the face, sexual organs, and lower limbs; owing to the greater sensibility and vascularity of the former, and the liability of the latter to injury and external irritation.

44. *B.* The *exciting causes* are — *a. Those which act locally*, as injuries of the head and face; contusions, wounds, and fractures; surgical operations, particularly when performed on cachectic habits; the scarification or puncture of anasarcous limbs; venæsection, and the bites of leeches; punctures of the skin, and the inoculation of morbid, putrid, acrid, or septic matters; the stings and bites of insects; abrasions of the cuticle; irritation caused by coarse articles of clothing, or by morbid secretions or excretions; the appli-

cation of stimulating or acrid substances to the surface, particularly rancid oils and unguents; and the want of personal cleanliness. — *b.* The more *general* and *internal causes* are — exposure to cold and moisture; atmospheric vicissitudes; suppression of the cutaneous excretion; a fish diet, and especially the use of shell-fish, or of dried, stale, or rancid fish; or of rich, oily, fat, or smoked meats; the suppression of accustomed secretions, excretions, and discharges — as the menses, hæmorrhoids, &c.; violent mental perturbation; an impure state of the air, particularly a stagnant and moist air, loaded with animal effluvia; the miasm from persons affected by the disease, when confined in a close atmosphere; and certain constitutions of the air, which are recognised only by their effects.

45. In persons strongly predisposed, and particularly in those who have experienced an attack, very slight errors in diet, and indigestible meats, especially such as are apt to induce a rancid, acrid, or acid change in the chyme; or spirituous or malt liquors in excess; very frequently induce a relapse or return of the disease. Indeed, whatever has the effect of altering the chyme and chyle from their healthy states, or of interrupting the functions of depurating organs, and thereby of changing the circulating fluids, either by the introduction of morbid and contaminating matters, or by the diminished elimination of hurtful or irritating elements, will excite this malady.

46. The influence of *infection* in causing erysipelas was first pointed out, and, indeed, proved, by Dr. Wells, the most original observer of disease in this country at the termination of the last and the commencement of the present century, when the state of medical science was by no means flourishing; and is fully confirmed by the observations of Pitcairn, Parr, Baillie, Dickson, Weatherhead, Stevenson, Arnott, Gibson, Bury, and Lawrence, referred to in the *Bibliography*; and by evidence that has occurred to myself on more than one occasion. — When thus caused, erysipelas is very prone to attack the face and throat, and assume dangerous or even malignant characters; more especially if it also be epidemic.

47. *C. Epidemic Erysipelas.* — Most writers on the disease, from Hippocrates to the present time, have mentioned its occasional appearance in an *epidemic form*, and the circumstance of its characters partaking of the prevailing epidemic constitution. On most of the occasions of my seeing it, from 1814 to 1824 or 1825, it possessed more or less of a sthenic or phlogistic type; and depletions early in the attack, were then better borne than more recently; it having, for the last few years (till 1834), presented chiefly adynamic forms. Its appearance in hospitals as a circumscribed epidemic is very common; and is generally owing to impure air, particularly during the cold, raw, and foggy east winds that prevail about the months of November and March; when the external air is in some measure excluded, and the air of the wards becomes loaded with miasms, or with the effluvium of one or more persons affected by it. In these circumstances, the constitutional disturbance presents, or passes speedily into, the adynamic or nervous states; the secretions, excretions, and circulating fluids being more or less morbid. Thus, according to the particular epidemic constitution, the habit of body, the age and strength, and the modes of living, of those affected; the season in which it prevails; the contingent generation of an infectious effluvium, or of an impure and confined air; and the pre-existing state of the assimilating and excreting functions; epidemic erysipelas will appear with a predominance either of inflammatory, or bilious, or adynamic, or nervous symptoms — on some occasions, with an inflammatory appearance of the blood; on others, with a loose, dissolved, and otherwise morbid state of this fluid; and always with the excreting functions more or less disordered. In some instances, the integuments are chiefly affected; in others, and those the most dangerous, the subjacent parts are principally, and often insidiously, diseased. It occasionally does not confine itself to the situation it first attacked; and frequently it seizes on the face, neck, and scalp; and is sometimes complicated with a similar form of inflammation of the fauces, pharynx, and surrounding parts, or of the digestive or respiratory mucous surface. An abrasion, or some palpable irritation, of the cuticle, or external injury, is sometimes required to originate an attack; but much more frequently it is the external expression of a morbid state of the frame, especially of the assimilating and excreting functions, and of the circulating fluids. On all occasions of its epidemic prevalence, the constitutional disturbance, ushered in either by rigors, or by irregular chills, precedes the local affection: sometimes in a very evident manner; at others, more slightly or obscurely; and, generally, the formation of matter, and effusion of fluid into the cellular tissue, are not attended by the well-marked symptoms usually indicating them in more healthy states of the body.*

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* Hippocrates (*Epid.* l. iii.) states, that erysipelas, epidemic in the spring, sometimes continues through the summer and autumn. — Bartholin and Sylvius describe an epidemic which was frequently complicated with inflammation of the stomach and bowels. — Tozzi (*Comment. in* Hippoc. *Aphorism.* l. vii. § 20.) remarks, that a fatal form of the disease was prevalent, during the autumn and winter of 1700, in Naples; and affected chiefly the face; delirium, epistaxis, and malignant symptoms rapidly supervening. When erysipelas is epidemic about the autumnal equinox, it sometimes abates during the winter, as remarked by Sydenham, and becomes again more prevalent in the spring. Richter states, that such was the case in respect of the epidemic of 1720-21, in Turin. It attacked any part of the body; but most frequently the face, neck, and limbs. Epistaxis and a lax state of the bowels were favourable occurrences. Bloodletting, in the more phlogistic cases, and medicines to aid the depurative processes, were found most beneficial. — In the epidemic of 1750, described by Darluc, the disease commenced with circumscribed redness in some part of the face, which spread over the head and face, and was attended by great tumefaction, a hard and frequent pulse, great thirst, anxiety, &c. In many cases, the affection extended over the throat, was accompanied with "difficulty of deglutition, hoarseness, a feeling of suffocation, and swelling of the external parts of the throat and neck," with delirium, thick and turbid urine, subsultus tendinum, &c.; and occasionally terminated in sphacelation. Offensive sweats, and free, copious, and fœtid alvine evacuations, were salutary. Bleeding at the commencement, followed by emetics, purgatives, and diaphoretic tisanes, was generally employed. If these were neglected, the affection of the throat often proved fatal. — Bromfield mentions the epidemic prevalence of the disease for two years; the head being affected. In it, the antiphlogistic treatment was generally fatal: bark and cordials were most serviceable. — Dr. Ferro, of Vienna, and Dr. Raggi, of Pavia, described an epidemic in these cities, during the years 1780 and 1783, which was frequently either associated with, or passed into, peripneumonia, colic, and diarrhœa. And, in all these complications, bloodletting, antimonials, diluents, and laxatives were the most successful remedies.

48. *D. Nature of Erysipelas.* — Dr. Cullen considered erysipelas to arise from the irritation of a morbid matter generated within the body, and thrown out, by the fever, upon the cutaneous surface. This is substantially the opinion of the ancients; and, with a very few slight modifications, of the best writers among the moderns also, especially the Franks, Selle, Richter, &c. — Sir A. Carlisle says, that "it is a humoral and constitutional inflammation occasioned by alimentary crudities," and attended by an excess of acid in the fluids. That it is a humoral and constitutional inflammation, is very generally admitted; and that alimentary crudities often precede and attend it, is also evident: I conceive, however, that not only a vitiated state of the chyme and chyle, proceeding from weak digestive power, or unwholesome and indigestible food, and vitiating the circulating fluids, but also the absorption of morbid effluvia, and the retention of effete matters in the blood, owing to impeded excretion, either by the skin, the liver, the kidneys, the mucous surfaces, or the uterus, — in short, that a morbid condition of the fluids, arising either from the passage into them of contaminating materials, or the retention in them of effete elements, that are constantly being excreted by the various emunctories, — are the principal changes productive of this disease.

49. These changes most probably depend upon deficient power of the digestive, assimilative, and excreting viscera — upon depression of the organic nervous influence. But, as soon as the change in the circulating fluid reaches a certain pitch, febrile action is the consequence; and the morbid matters in the blood are determined to excreting surfaces and organs, which are thereby exerted either to eliminate them, or to assume a morbid state of vascular action. The skin, being one of the most important of these organs, thus becomes irritated and inflamed, owing to its peculiar functions and susceptibility, and to the nature of the irritating matters contained in the blood, or of the change this fluid may have experienced. If the febrile commotion be characterised, owing to the state of vital power, by much sthenic action, the local change will be thereby fully developed, and thrown chiefly upon the excreting surface; but if, from deficient power, the fever partake more of an adynamic or asthenic form, the local expression of the disease will be made less fully on the external surface, and will fall more fully upon subjacent and internal parts. Hence the frequency of internal complications, and of affection of subcutaneous tissues, in adynamic cases; and of the simple and superficial forms in the more inflammatory and sthenic, unless when the disease is attended by a great excess of vascular action above vital power; when the local affection extends to adjoining parts from this circumstance, in connection with the morbid state of the blood. The diffusive character of the inflammation, whatever tissue it may attack, is referrible entirely to defective vital power, to the changes in the circulating fluids, and to the imperfect tone of the extreme vessels, — these conditions being inadequate to the formation of coagulable lymph; the products of inflammatory action in this state of vital power, and of vascular action and impurity, being a turbid, puriform, ichorous, or sanguineous serum, which produces a septic effect, or poisons the adjoining parts, especially the cellular tissue.

50. VIII. Erysipelas of Infants — *Erysipelas Neonatorum*, Hildenbrand and Richter — may be either simple or complicated; and it may attack either the head, trunk, or extremities. When it appears on the trunk, it generally commences at the umbilicus; the abdomen, trunk, and lower extremities being its most frequent seat in infants. It is generally accompanied with phlyctenæ or large bullæ; and it is sometimes complicated with œdema or inflammation of the subjacent tissues, and with inflammation or congestion of internal organs. It is most common from birth to a year old; and is sometimes remarkably prevalent in lying-in and foundling hospitals. The occurrence of Bullæ, in nearly all the children born for many months in Queen Charlotte's Lying-in Hospital, alluded to in that article (§ 4.), was evidently referrible to a more than usually superficial, slight, and uniform kind of erysipelas, which affected the whole surface in many instances, and not any one part in preference to another.

51. When attacking infants, erysipelas presents the following conditions and morbid relations: — 1st, It is sometimes referrible to imperfect ablution and removal, soon after birth, of the secretion which covered the cuticle, and which becomes acrid and irritating if left in contact with it; — 2d, It frequently proceeds, especially in hospitals, from a foul air or other contaminating agents, or irritants, acting either internally, or on the uncicatrised umbilicus; — 3d, The retention of excrementitious matters, as the meconium, and morbid secretions, evidently dispose to it; — 4th, Want of care and of due cleanliness, especially as to the immediate removal of the excretions from the parts with which they come in contact, is also a common cause; — 5th, It is probably favoured, as M. Billard suggests, by the great vascularity of the external tissue of the integuments at this epoch; — 6th, It is not so frequently complicated, or attended by great disorder of the circulating fluids, as in aged persons, although it is generally accompanied with disorder of the excretions, and often with an inflammatory state of the digestive mucous surface, and occasionally with disease of the throat and respiratory organs; — 7th, The attendant fever is more commonly of an inflammatory kind, than in adults and aged persons; — 8th, It *terminates* in resolution, suppuration, and gangrene; this last occurring frequently when the disease commences about the umbilicus and genitals; and occasionally in *Induration of the* Cellular Tissue (see that article); — 9th, The affection of the pudendum, and the complication with disease of the throat, are rarer in infants than in children from a year to five or six years of age; — 10th, It is generally attended by great danger, especially when it prevails in lying-in and foundling hospitals, owing to the frequency of its complication with, or metastasis into, internal disease; — 11th, Fatal cases usually present inflammatory appearances in the digestive mucous surface, and less frequently in the respiratory surfaces and membranes of the brain, in connection with destruction of the subcutaneous, cellular, and adipose tissues; a turbid, puriform, or sanguineous serum

being sometimes effused from the serous surfaces, but never coagulable or albuminous lymph.

52. IX. **Treatment.** — So numerous are the shades of difference, as to both nature and degree, between the mildest and severest forms of erysipelas, that no general plan of treatment can be proposed, without modifications according to the circumstances of particular cases. In some instances, large depletions are required; in others, moderate or local depletion only is admissible; and, in many, depletion is most injurious, the most energetic tonics being often indispensably necessary. Whilst the disease thus requires, *from the very commencement*, most varied and even opposite modes of cure, it frequently also demands an almost equal diversity *at different stages* of its progress. The following, as remarked by Mr. **James**, is, perhaps, the most extensively applicable precept, as to treatment, that can be inculcated: — Where the skin is tense, deep-coloured, and hot, with a high pulse, full and flushed face, active delirium, and great heat of the general surface, and the constitution not materially impaired, depletion is well borne, and is required; but where there is no tension, nor much heat, nor great redness of the part; the pulse being soft, the countenance pale or sunk, the general temperature but little elevated, and the delirium quiet or comatose; depletions are injurious, and a restorative treatment is most appropriate. In the former class of cases, the reduction of the external inflammation, by local as well as by general means, is most serviceable; but, in the latter, the external affection is a small part of the disease, relief to the system often arising from encouraging it, and great injury from repelling it. — Even in the most acute and inflammatory cases, large depletions should be employed with much circumspection; for, however high, bounding, or hard the pulse, or great the heat, may be, there is always, owing to the circumstances explained above (§ 16. 49.), a disposition to asthenic vascular action, and a deficiency of vital power. Bloodletting, especially venæsection, should, therefore, be resorted to early in the attack, and should not be solely or even chiefly relied upon; the reduction of the excited action forming only one of the intentions of cure; and bloodletting being only one of the modes of fulfilling it.

53. i. *Treatment of Simple or Superficial Erysipelas.* — *A.* The *mild* or *benign form* requires only simple measures. *Purgatives* with the alkaline subcarbonates, warm *diaphoretics*, and *diuretics*, are most beneficial, if exhibited so as to promote the depurating or secreting functions. After the bowels have been fully evacuated, the *decoction of quince seed* may be given frequently, with mucilage, nitrate of potash, subcarbonate of soda, and spirit of nitric æther. If this form become erratic, a combination of *tonics*, especially bark, with these, will generally remove all disorder. I have found the following remarkably useful: —

No. 217. ℞ Sodæ Subcarbon. ʒj.; Vini Ipecacuanhæ ℈ij.; Spirit. Ammon. Arom. ʒj.; Infus. Sennæ Comp. ʒij.; Decocti Cinchonæ ℥iij. Tinct. Cardamom. Comp. ʒiij. Misce. Capiat partem tertiam, ter in die.

54. *B.* The slighter cases of the *acute form* of superficial erysipelas are generally removed by the above means. If, however, vascular action be much excited, local *depletions*, or a small or moderate bloodletting, followed by *diaphoretics*, depurating *purgatives*, and *abstinence*, are always serviceable. When the head is unaffected, particularly if the disease occur in autumn; and after depletions, if requisite, have been practised; an *emetic*, early in the attack, generally restores the impeded functions of the liver and skin. A dose of *calomel* and *James's powder*, with two or three grains of *camphor*, should be exhibited at bedtime, and a *purgative* early the following morning; this last being repeated every morning, and diaphoretics, with diuretics, every three or four hours during the day. If the disease be caused by suppression of the perspiration, *diaphoretics*, as **Richter** very justly remarks, are especially indicated; the affected part being constantly covered by oiled silk, to prevent evaporation from it. The acetate of ammonia, antimonials, and camphor, are the most appropriate of this class of medicines. If the head or face be affected, a general bleeding — preferably from the feet, whilst immersed in warm water — is requisite; and the means just mentioned, with the exception of the emetic, ought to be freely prescribed, the action on the bowels being promoted by purgative enemata (particularly F. 150. or 151.). *Colchicum* may be tried in this and the phlegmonoid varieties. It was much recommended by Mr. **Haden**, and recently by Mr. **Bullock**. It is most serviceable when given with the alkaline subcarbonates, or magnesia.

55. The choice of purgatives, and of the medicines that should be combined with them, is a matter of much greater consequence in this complaint, than is usually supposed. I have most frequently given the calomel in the above combination at first; and afterwards, the compound infusions of gentian and of senna, with a neutral salt. This last may also be prescribed in camphor mixture, with an alkaline carbonate, and taken whilst effervescing with lemon juice, the alkali being in excess. — **Richter** advises equal quantities of the supertartrate of potash and magnesia. Sir A. **Carlisle** recommends the fixed alkaline carbonates to be given with the purgatives; and barley water, with the subcarbonate of soda, to be used as common drink; on the supposition of the disease arising from an acid in the blood. It is possible that the change in this fluid may partake of an acid character, but we have no proof of it; nor can it be the only, or even the chief, change. The practice, however, has been long known to be serviceable. I believe that the carbonates of potash and soda pass rapidly into the circulation, and act beneficially on the blood. Yet acids may be given not only without risk, but apparently with advantage. They have even been recommended by **Marcard**, **Panzani**, and others. In a case which I recently saw in consultation with Dr. **Riding**, and which was complicated with menorrhagia of a most atonic kind, and with nervous symptoms, large doses of mineral acid were added to tonics, and yet the recovery was rapid. The neutral salts, which are most to be depended upon, are — the sulphates of potash, soda, and magnesia; the tartrate of potash, or of potash and soda; and the phosphate of soda. Either of these may be given in the infusion of senna, or in equal parts of it and of the infusion of gentian, or of bark. The association of purg-

atives with tonic and bitter infusions is of the greatest benefit at all periods, and particularly at an advanced stage of the complaint. F. 215. or the following may be employed: —

No. 218. ℞ Potassæ Sulphatis ʒj.; Sodæ Subcarbon. ʒjss.; Infus. Sennæ Comp., Infus. Gentianæ Comp., āā ℥iijss.; Tinct. Jalap. ʒijss.; Tinct. Cardamom. Comp. ʒiij. M. Fiat Mist., cujus capiat Coch. iij. larga, secundâ vel tertiâ quâque horâ, donec plenè dejecerit alvus.

56. After morbid secretions have been evacuated by these means, and the functions of the skin and kidneys promoted, the infusion or decoction of cinchona, or the infusion of cascarilla, may be taken with the alkaline subcarbonates, or with liquor potassæ; and if the urine be scanty, the spirit of nitric æther, or of juniper, may be added. If the skin still continue harsh or dry, the lighter infusions, or camphor mixture, may be given with the solution of acetate of ammonia, and the spirit of nitric æther, or ipecacuanha wine. When excoriating secretions from the vesications on the surface extend or increase the irritation, defective function of the excreting organs should be suspected, and deobstruent and stomachic purgatives perseveringly prescribed. The morbid action, also, of the part ought to be corrected by washes containing a solution of the chlorates of lime or of soda, or by those consisting of lime water, or of Kréosote water; or by applying the linimentum terebinthinæ. If dry incrustations form on the surface, oiled silk should be constantly applied over it. But in ordinary circumstances, especially of the constitutional disease, it is advisable to abstain from local applications, or to resort merely to bathing or sponging the part with some tepid fluid, as the decoction of *quince seed*, or of the flowers of the *lime* (*Tilia Europea*), if the heat, pricking, &c. be troublesome. Where the vesications are numerous, the practice of dusting the part with flour, or any other absorbent powder, is warranted by the results of experience. Of *incisions* and other local means, especial notice will be taken hereafter.

57. Where a disposition to terminate in œdema of the subjacent tissues becomes apparent, the measures to be adopted must depend upon the state of the constitution, and on the previous treatment. If the former be not much impaired, and if the latter have not been energetic, purgatives, as directed above, and warm diaphoretics, should be frequently exhibited, and a blister applied to the part. But if the vital powers be much impaired, the more restorative remedies, and the local means, recommended in the next section (§ 58.), should be resorted to. Where the inflammation of the integuments extends to the parts beneath, and the skin becomes tense, local depletion by leeches, scarification, or incisions, and the other measures directed in this association of the disease (§ 60.), should be adopted.

58. ii. *Treatment of Associated and Complicated Erysipelas.* — *A. In the association with œdema of the subjacent cellular tissue*, the utmost attention to the state of health, the age, and habits of the patient, is necessary. When it occurs in broken-down constitutions, and persons addicted to spirituous liquors, not only should tonics, &c., particularly cinchona, quinine, cascarilla, with soda or potash, camphor, the preparations of ammonia, &c., be exhibited, but also wine, light nourishing diet, and occasionally small quantities of the beverage to which the patient has become habituated. But these remedies should be preceded by, or alternated, or even conjoined, with, such purgatives as are most active in promoting the secretions and excretions, which are generally deficient in this state of disease. If the bile be scanty or morbid, *calomel*, blue pill, PLUMMER's pill, or the hydrargyrum cum creta, should be given with camphor; and the mixture last prescribed ought to be taken a few hours subsequently, and continued from time to time. Those who have been addicted to spirituous liquors, are most benefited by half an ounce each of the spirit of turpentine and of castor oil, taken on the surface of weak Hollands or common gin. This dose may be repeated on alternate days: it will be found remarkably beneficial when the urinary secretion is deficient; or when the affection of the skin is consequent upon anasarca. In this latter circumstance, the infusion or decoction of cinchona may be given with the *chlorate of potash*, and the tincture of cinchona, more especially if there be any tendency to gangrene, or if the temperature of the surface be low, and the colour deep or dark.[*] Either of the purgatives prescribed above (§ 55.), should likewise be taken occasionally. Fomentations with decoction of chamomile flowers and camphorated spirit may also be employed, early in the disease. It is in this variety, as Mr. S. COOPER remarks, that pressure by bandages, as recommended by MM. RAYER, BRÉTONNEAU, and VELPEAU, is most appropriate. After morbid secretions have been evacuated, and the use of tonics, with camphor in full doses, or with the chlorate of potash, or with both, has been commenced — the part being greatly distended, and the surface irritable or disposed to gangrene — I have seen immediate and remarkable advantage accrue from the application of a warm cloth, moistened either with the spirits of turpentine, or with F. 311., the bowels being kept regularly open by the oily draught, or by the stomachic purgatives directed above; or by enemata, particularly F. 135. 150. and 151., either of which should be repeated according to its effect.—When sphacelation has commenced, a poultice of the powdered bark, or of carrots, and this spirit; or a solution of the chlorate of lime, or applications containing the Kréosote; are the means which promise the most advantage.

59. *B. Treatment of Erysipelas associated with inflammation of the subcutaneous tissues.* — This most serious form requires, according to the grade and kind of vascular action, local and constitutional; the age, strength, and habit of the patient, and the stage of the disease, the most varied, but still the most active, treatment — in some cases general or local depletion, or both; and in others, as invigorating remedies as were prescribed for the preceding variety; — in an early stage the former means, and in a later period the latter. The treatment of this variety may be divided — 1st, into that which should be adopted before suppuration has taken place;

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[*] I have lately had an opportunity of trying the *Kréosote*, in doses of from one to three drops, four times a day, in a case of this variety. It increased the urinary secretion; but it was not so beneficial as the chlorate of potash, which I have been long in the habit of prescribing. I have, however, found it useful in atonic dropsy, and general cachexia.

and, 2dly, into that which is required when suppuration or disorganisation has occurred.

60. *a. Before suppuration or disorganisation takes place,* the most varied, and even opposite, measures are often necessary, according to the age, strength, and habits of the patient, the prevailing epidemic constitution, and the local and constitutional symptoms. When the surface of the inflamed part is of a deep or florid red, tense, and very hot; the pulse hard, full, or strong; the head much affected; and the papillæ of the tongue erect and excited; both general and local *bloodlettings* are requisite, especially in unbroken constitutions, in persons not addicted to intoxication, and very early in the disease. When erysipelas attacks the head, or face, and insufficient epistaxis occurs, *venæsection* should be resorted to; but when it appears in other parts, a large number of *leeches* should be applied, or *incisions* made, as recommended and practised by Mr. Copland Hutchison. This local mode of depletion will often be sufficient, excepting in the most phlogistic cases, when venæsection may also be necessary. But in large towns, and in hospitals, this latter will seldom be required, if the former have been employed with decision. Besides, in these circumstances especially, there is considerable risk of inflammation attacking the vein. When sufficient blood is not procured by leeches or incisions, *cupping* around, or even over the part if it can be borne, will frequently be preferable to venæsection. In proportion as the local and constitutional symptoms approach to those described under the head of *Diffusive Inflammation of the* Cellular Tissue, is the necessity for bleeding diminished — that which necessarily attends the incisions of the part being often sufficient, — and for the restorative and tonic treatment there recommended (§ 34. *et seq.*) increased, especially after morbid secretions and fæcal matters have been evacuated. Where the skin is but little affected; the powers of life depressed, from antecedent visceral disease or intemperance; and the affection of the subjacent parts extending rapidly; the remedies advised in that article should be prescribed energetically. When the pulse is broad, open, and expansive, or tumultuous, or easily compressed, although it be quick, sharp, or even bounding, general bloodletting is injurious; the local affection either extending, or changing its place, and vital resistance sinking from the evacuation. In the form ot this complication first described by Mr. Copland Hutchison, wherein the inflammation extends to the fasciæ, to the intermuscular cellular substance, and to adjoining parts, incisions sufficiently deep to divide the fasciæ, as he directs (see *Surgical Observations, &c.* p. 110. 2d edit.), are most indispensable, whatever may be the state of general vascular action and constitutional power: for if these be of a *sthenic* kind, the incisions come in aid of the necessary depletions; and if they be *asthenic*, local congestion and effusion are thereby removed, and the operation of restorative remedies in no way impeded.

61. The observations made respecting other evacuations in simple erysipelas, very nearly apply in this complication. — *Emetics* are recommended by Reil, Retz, and Roux, and are most beneficial in the more sthenic diathesis, where those of antimony may be employed; and least so where the disease approaches the character of diffusive inflammation of the cellular tissue. If at all prescribed in the latter state, ipecacuanha, conjoined with ammonia or camphor in full doses, is preferable. The early and repeated exhibition of *purgatives* is as requisite in this as in the simple forms; and the choice and combinations of them, there directed (§ 55.), may be adopted. But, in proportion as the characters of diffusive inflammation of the subcutaneous tissues are assumed, the more warm and stomachic should the purgatives be. Where this kind of complication predominates, the treatment described in that article (§ 34. *et seq.*) should be followed. — *Diaphoretics* also, as already recommended, are usually of service; but the selection of them should depend much upon the state of the stomach, and the constitutional powers. Where the former is not disturbed, and the latter are not much depressed, small doses of antimony with other diaphoretics are beneficial; particularly if the febrile action be great, and at an early stage of the disease: but if the stomach be irritable, diaphoretics ought to be given in effervescence, generally with an excess of the alkali; and, if vital power be much depressed, those with the carbonate of ammonia and camphor are preferable. If the edges and point of the tongue be red, and the epigastrium tender, a blister, or sinapism, or the warm turpentine epithem, should be placed over this region, and small doses of the nitrate of potash, with subcarbonate of soda, prescribed in the decoction of quince seed, or of linseed, or of the flowers or bark of the lime or linden. — *Mercurials*, at the commencement, and occasionally afterwards, are generally of service. Calomel is most to be depended upon; and, when conjoined with camphor or ammonia, it may be taken in any state of the disease, if the biliary and other secretions require its exhibition. In low states of vital power, it should be followed, in three or four hours, by a stomachic purgative, the action of which may be promoted by a cathartic enema (§ 55. 58.).

62. *Opiates* or other anodynes are often necessary, particularly when there are watchfulness, general irritability, and much pain, which are often the precursors of, or even tend to induce, delirium. But they should be given with great caution. They are hazardous means, if prescribed before morbid matters are evacuated, or where there is any tendency to coma. The *acetate of morphine*, in a full dose in aromatic spirits, at bedtime, is most to be depended upon. — *Bark* and other *tonics* are necessary from the commencement, when the disease presents more of the *diffusive*, than of the *phlegmonoid*, characters. At first, the bark may be given in decoction or infusion, particularly when the propriety of exhibiting it is doubtful; and with the alkaline subcarbonates, or with the solution of the acetate of ammonia. In cases of manifest asthenia, or cachexia, and diffusive appearance, either the sulphate of quinine, or the bark in substance, with camphor and aromatics, may be prescribed; but I have generally found the decoction, with the chlorate of potash, and with either the compound tincture of bark, or the tincture of serpentaria, to act beneficially, when alvine evacuations were sufficiently promoted by suitable means.

63. In the *three grades of the phlegmonoid*

(§ 29. *et seq.*) complication, the same principles as have been now stated are applicable. Depletions and other evacuants should be prescribed with a promptitude, and to an extent, co-ordinate with each, and with a due regard to the peculiar circumstances of the case; always recollecting that, in diseases like this, which are connected more or less with imperfect excretion and a morbid state oft he circulating fluids, vascular action may be excessive, whilst nervous power and vital resistance are reduced to the lowest states; and, therefore, that vascular depletion, in order to be salutary, or even not to be injurious, should be early employed, and with strict attention to its effects both at the time and immediately afterwards. Nor should it be overlooked, that, in circumstances where the propriety of general or even local depletion appears doubtful, either one or the other, or even both, may be practised, if judicious restorative means are also resorted to, especially in conjunction with such remedies as promote the excreting functions, and purify the blood, or correct its morbid state.

64. *b. When suppuration, or disorganisation, has taken place,* or when either is inevitable, general bloodletting is no longer admissible, although the vascular excitement may be great; and the only local depletion that can be ventured upon, is that which will follow *incisions,* which should now be made, if they have not already been resorted to. In some cases, however, the application of leeches, or cupping around the part, may still be ventured on, if the local action be high, and the changes now in question be only commencing. But where matter has already formed, or parts have sloughed, venæsection, or emetics, or even lowering purgatives, will only promote the absorption of morbid matters from the diseased part, and the consequent contamination of the circulating fluids, instead of throwing them out upon the surface, and facilitating their expulsion through the outlets which ought to be made for them, by incisions down to their seats. In proportion as disorganisation is manifest, or advances, so should restoratives and tonics be freely administered; and either those already mentioned, or those prescribed in the article on *Diffusive Inflammation of the* CELLULAR TISSUE (§ 34.), ought to be liberally used; with the aid of wine, and such nourishment as the state of the digestive organs will admit of. The stomachic purgatives and evacuants, directed above (§ 55. 58.), should be given occasionally, in order to remove morbid collections, and promote the depurating actions of the abdominal viscera on the blood. In constitutions broken down by intemperance, the beverage to which they have become habituated is the most serviceable, as Sir A. COOPER has justly remarked; but, in other circumstances, wine may be taken in soda water, or in spruce beer, to which a little of the subcarbonate of soda or of potash has been added. When a free outlet has been given to matter or sloughs, advantage will often accrue from the injection of a weak solution of any of the chlorurets, or of Kréosote water; and the use of compresses and bandages around or above the seat of disorganisation, in order to prevent its extension.

65. *C. Erysipelas with Nervous and Cephalic Symptoms.* — *a.* When the nervous symptoms appear early, and the head or face is not the seat of the disease, the attendant fever assuming this form, gentle tonics and diaphoretics are serviceable, especially the infusion of valerian, with the solution of the acetate, and the aromatic spirit, of ammonia; or the infusion of bark or of cascarilla, with the alkaline subcarbonates, and the preparations of camphor; or either of these infusions, with the tincture of serpentaria and the chlorate of potash. RICHTER remarks, that, when the attendant fever is of the nervous kind, the local affection is most prone to change its place, or to recede from the surface, and attack internal organs. I believe that there is much truth in this; and that these changes are less likely to occur when the above remedies are resorted to, and a blister is applied over the affected part; the excreting functions being moderately promoted by stomachic purgatives and enemata.

66. *b.* Where *delirium* supervenes, its treatment must depend upon its form, the seat of the local affection, and state of the system. When the fever is of the nervous kind, delirium is an early symptom, and the result chiefly of the febrile action, and depression of nervous power; the means now mentioned, especially if morbid excretions have been evacuated, being then beneficial. If the tongue be, at the time, moist, camphor and anodynes may also be prescribed. But when delirium is connected with general vascular excitement, depressed power, and manifest disorder of the circulating and secreted fluids, the alterative and stomachic purgatives, and enemata prescribed above (§ 55. 58.), are most to be depended on. Where the disease attacks the face and head, the delirium frequently proceeds from inflammatory action in the membranes of the brain, and rapidly passes into coma, from effusion and exhaustion of vital power. In this case, early bleeding from the feet, or cupping on the nape of the neck, or a number of leeches to the occiput and behind the ears; mustard pediluvia; cold applications to the head, if the heat be excessive and the patient young or robust; and active cathartics, both by the mouth and in enemata; are to be prescribed. If great and deep-seated tumefaction take place in the scalp, particularly about the occiput, incisions should not be overlooked.

67. *c.* When profound *coma* comes on, the excretions being voided involuntarily and unconsciously, when the pulse is rapid, and the tongue and gums covered by a thick fuliginous coating, what measures should be resorted to? This occurrence is frequent; is attended by the utmost danger; and is seldom satisfactorily treated. In several cases, I have resorted to the following means with success: — 1st, Unless calomel has been already taken largely, a full dose of it, with camphor, ought to be prescribed, in some thick substance, and placed upon the back part of the tongue, when it will gradually be swallowed; — 2d, Two or three hours afterwards, turpentine, with an equal quantity, or with one half or two thirds the quantity, of castor oil, with a little liquor potassæ, should be exhibited in the form of an electuary, and as just directed, if the coma be profound, or in any other form, if the patient can be roused sufficiently to take it; and repeated frequently until the bowels begin to act; when its operation may be promoted by enemata (F. 150, 151.); — 3d, If matter form in any part, incisions

should be made early, and through the aponeurotic expansions, where there is the least risk of matter forming beneath them *; and 4th, Blisters to the insides of the thigh, or to the nape of the neck, and between the shoulders, should also be directed, if the symptoms be not soon ameliorated by the preceding means; and the calomel and camphor repeated every five or six hours, until the tongue and gums evince the specific operation of the former; when warm or stomachic purgatives, aided by the enemata already advised, and gentle tonics, ought to be given from time to time, to evacuate morbid secretions and support the vital powers.

68. *D. Treatment of Gastric and Bilious Erysipelas.* — *a.* Where the yellowish coating of the tongue, the appearance of the surface, or of the excretions, and nausea or vomiting unattended by much tenderness at the epigastrium, indicate *biliary disorder*, an *emetic*, given early in the disease, if the head be not seriously affected, is usually of service. After its operation, a full dose of calomel, purgatives, laxative enemata, diaphoretics, and the other measures already recommended, according to the external character of the disease, and the states of general and local vascular action and of vital power, should be prescribed, and repeated as circumstances may require. Wherever tenderness of the epigastrium or hypochondria exists in connection with the nausea or vomiting, local depletions in the vicinity, blisters, sinapisms, or warm terebinthinated epithems, placed over these regions, will be of essential service. The last of these should be applied until it produce redness, and be repeated according to its effects upon the disease. Whenever any part within the abdominal or thoracic cavity is affected, either coëtaneously with, or consecutively upon, or even after the disappearance of, erysipelas, these are the most effectual remedies, especially when aided by mercurials, prescribed either alone, or with camphor and opium.

69. *b.* Where this specific form of inflammation seems to affect *the digestive mucous surface*, small and repeated doses of nitre, with the subcarbonate of soda, in the decoction of quince seed, or of the lime bark; camphorated emulsions; diaphoretics in mucilaginous vehicles; local depletion, and the external means just specified, are most to be depended upon. In both this and the hepatic complication, calomel, blue pill, or hydrargyrum cum creta, may also be given with opium and small doses of camphor, until the gums are affected; but it also will often be necessary to evacuate morbid matters by stomachic and mild purgatives, and to support the strength by light tonics, especially at an advanced stage. In most cases of internal erysipelas, particularly if parts within the abdominal cavity be affected, calomel with camphor and opium, terebinthinated purgatives, and the epithems above mentioned (§ 68.), are of the greatest benefit.

70. *E. The association with Inflammation of the Throat and Pharynx*, being often attended by much danger, especially if the fever be of an adynamic kind, or if the head and face be affected, requires early and active treatment. Venæsection, or local depletion, or both, are frequently necessary; but the propriety of having recourse to them, and the extent to which either of them may be carried, must depend upon the state of general, as well as of local, vascular action, and vital power. Where there are great swelling of the external throat, and tension of the integuments (§ 33.), *incisions* should be made in the manner about to be directed (§ 80.), and the internal treatment conducted appropriately to the states of the different functions, conformably with the principles developed above. If the swelling and tension be less, and the symptoms not so urgent as to require incisions, a large *blister* may be applied to the lower half of the neck, extending over a part of the sternal region. Active *cathartics*, aided by the frequent exhibition of

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* The following case occurred, eleven years since, to a very able practitioner, Mr. H. Cox, formerly House-Surgeon to the Infirmary for Children; and was soon afterwards published by him. I quote it in an abridged form, as it illustrates this complication, and the treatment recommended. It, moreover, is evidence of facts connected with the treatment not only of this, but of other maladies: — "Jane Guest, aged 21, was seized, Jan. 22. 1824, with rigors, and fits of hysteria, to which she was subject. On the fourth day, her scalp had become red and swollen, and the tongue tumid and red. Delirium and great restlessness afterwards supervened, and the erysipelas extended over the face and neck to the sternum. The eyes were now completely shut, and the features so swollen that she could not be recognised. In two or three days she passed into a state of coma and insensibility." — "The pulse, which was formerly full, but easily compressed, was now excessively quick; the tongue was black and crusted; and she rolled towards the foot of the bed. The treatment usually resorted to in similar cases had failed to ameliorate any of the symptoms. The condition of the patient was, on the 31st of January, the worst possible. The pulse could not be counted; she was profoundly comatose; the integuments of the head were distended to the utmost; and the tongue, teeth, and gums were covered by a fuliginous coating. At this date, I stated the case to Dr. Copland, as one for which there was no room for hope. He strongly advised me to exhibit the oil of turpentine in large doses, as he had experienced success from the use of it in several cases characterised by similar symptoms to this." — "I had had many opportunities of witnessing the beneficial effects of this substance at the Royal Dispensary for Children, where Dr. Copland had introduced its frequent use. I, therefore, according to his advice, prescribed as follows: —

"℞ Olei Terebinthinæ ℥ss.: Olei Ricini ʒij.; Mellis ʒij. Misce. Fiat Electuarium statim capiendum.

"℞ Olei Terebinthinæ ʒvj.; Olei Olivæ ℥j.; Aquæ ℥x. Misce. Fiat Enema statim administrandum.

"*Feb.* 1st. — Several offensive evacuations. Pulse somewhat stronger, and not quite so quick. The coma is less profound.

"℞ Olei Terebinth., Ol. Ricini, āā ℥jss.; Mellis q. s. ut fiat Elect. Sumat, tertiis horis, partem quartam.

"2d. — The patient could be roused. The mouth, teeth, and gums were cleaner; the pulse 130, and fuller. The local symptoms were ameliorated. The oils have procured several bilious evacuations.

"℞ Olei Terebinth. ℥jss.; Ol. Ricini ℥ss.; Liq. Potassæ ʒj.; Aq. Cinnamom. ℥iv. M. Capiat partem quartam, quartis horis.

"3d. — Much better. Pulse 120, and more natural as to strength. The tongue is beginning to become clean. The bowels have acted copiously, and much yellow bile has been voided. The patient now answers the questions put to her," &c. From this time her recovery was uninterrupted. (*Lond. Med. Repos.* for April, 1825, p. 299.)

There is much misapprehension as to the operation of full doses of turpentine, given either by the mouth or in enemata; many supposing that they increase vascular action in the brain. The reader will perceive, upon perusing the account (published in the *Lond. Med. and Phys. Journ.* for May and July, 1821.) of the experiments I performed — 1st, upon myself; 2dly, upon the lower animals; and, 3dly, in numerous cases of disease — that this substance, given so as to act upon the bowels, either from the largeness of the dose, or by the aid of a purgative conjoined with it, is a powerful derivative from the brain, diminishes vascular action in serous membranes, and restores lost tone to the extreme capillaries, especially in exhaling surfaces. The extensive experience I have since had of this medicine, has confirmed these inferences, but has shown that it may be injurious in the hands of those who are not well acquainted with the exact circumstances in which it may be given with advantage.

enemata (F 135. 151.); *gargles* with a solution of the chlorate of soda or of lime; or of the nitrate of silver; and diaphoretics; are also very generally appropriate and beneficial. Although *depletions* are very often necessary in this complication, yet venæsection is sometimes injurious, and always in the adynamic forms, or at an advanced stage. In two cases in which I was lately consulted, an aggravation of both the local and constitutional symptoms followed bloodletting, though resorted to early, and in moderation. In this, as in every other form of the disease, the treatment should mainly depend upon the states just mentioned; and upon the various circumstances peculiar to the case.

71. *F.* Where the *Erysipelatous Inflammation extends to the Larynx or Bronchi, or affects the Lungs,* venæsection is frequently required, but not always to a great amount: in some instances, it has even appeared injurious. Local depletions, however, are generally necessary. The chief dependence should be placed upon the external applications mentioned above (§ 68.), which ought to be repeated, sometimes oftener than once; and on purgatives, demulcents, and antimonials, or other diaphoretics; these being the chief means of exciting the excreting functions, and thereby of removing the constitutional derangement upon which the local affection depends.

72. *G. When erysipelas supervenes in the course of fevers,* venæsection is inadmissible; but the early application of leeches to the part is often of service. Internal inflammations appearing in connection with external erysipelas, admit not of vascular depletions nearly to the extent required by true or idiopathic inflammation; local depletions, calomel, camphor and opium, terebinthinated purgatives and enemata, and the external and other means just particularised, being the most efficient remedies in such cases. Whenever erysipelas attacks internal parts, it may be referred either to insufficient power to determine the morbid action to the surface, or to pre-existing disorder of the part affected, or rather to both. But as all such complications present similar states of vital action to the more simple forms of the disease—varying from the more phlogistic to the most diffusive or adynamic, according to the age, constitution, and habits of the patient, the causes and stage of the disease, and the characters of the prevailing epidemic — so do they require a treatment varying from the strictly antiphlogistic, to the most energetically restorative and tonic.

73. *H.* If *Inflammation of the Lymphatics* or *of the Veins* appear in the course of the complaint, or be associated with it — circumstances by no means uncommon when the upper or lower limbs, especially the former, are affected — general blood-letting is always injurious, and even local depletion is seldom beneficial. The liberal exhibition of tonics and stimulants; of stomachic and mild aperients; and of warm diaphoretics; with anodynes (§ 62.) if the pain and irritability be great; and emollient and anodyne applications to the part, particularly if the absorbents be inflamed; are chiefly to be trusted to; the intention being, in all such cases, to arrest the extension of disease, and prevent the contamination of the circulating fluids.

74. The *spurious forms of Erysipelas,* which are often connected with *inflammation of deep-seated parts,* and which most frequently occur in the extremities, should be treated according to the principles developed above, and in the article on the CELLULAR TISSUE; free incisions being particularly requisite for them (§ 80.).

75. *I. Depletions* and other *antiphlogistic remedies* are serviceable chiefly in a very early stage, whether of the simple or of the complicated disease, however high vascular action may seem; and, although they have been most requisite at that period, and energetically employed, a very active recourse to *stimulants* and *tonics* will often subsequently be necessary. Frequently, also, where the propriety of resorting to moderate or local depletions is unquestionable, the good effects of *restoratives* and tonics, *exhibited even at the same time,* are equally manifest; this complaint, oftener perhaps than any other, requiring vital power to be restored by the latter means, whilst vascular action and congestion are being subdued by the former, and by medicines which promote the secreting and excreting functions. The *stimulants* most to be depended upon, are — *camphor* and *ammonia,* or their preparations, given in large doses when the head is unaffected, or nervous power is exhausted; and the tonics already mentioned. Various substances, which are both stimulant and tonic, as *serpentaria, arnica,* &c. are useful adjuncts to the barks; and others, which possess more of an antiseptic property, as the *chlorates of potash* or of *soda,* or the *kréosote,* are often of essential service, especially in advanced stages of the disease. The frequent and manifest dependence of the complaint upon a morbid state of the circulating fluids, has induced some writers to recommend the carbonates of the fixed alkalies, and such other substances as affect more immediately the state of the blood; but although these are often beneficial, they ought not to be depended upon alone. The morbid condition of the blood is the result of imperfect action of the excreting organs, consequent upon defective vital power. The chief intention, therefore, should be to excite the functions of these organs, by agents which operate specifically and beneficially upon them, and by those which rouse the vital energies generally, and resist the extension of morbid changes.

76. iii. *Of the local Treatment.* — *A. a. Cold applications* have been recommended by several writers, but they are not always safe, and ought not to be prescribed when there is very evident adynamia, or for aged persons, or broken-down constitutions. In the more phlogistic states, at an early stage, and especially when these states occur in the face or head, they frequently afford much relief. — *b. Warm poultices* and *fomentations* are objectionable in the phlegmonoid, and, indeed, in the other varieties, unless under some circumstances of the disease connected with local injury. — *c.* In the strictly constitutional complaint, neither of these are of much service; dusting the part with flour or any other absorbent powder, when the vesicles break, or sponging it with some tepid and soothing fluid, if the heat and pricking pain be troublesome, being the safest practice.

77. *B. a.* The application of the *nitrate of silver,* in substance or in strong solution, as recommended by Mr. HIGGINBOTTOM, is often of great benefit,

It should be applied either to the inflamed surface and the adjoining integuments, or only to the healthy skin surrounding the affected part; and it should raise the cuticle, otherwise it will be of little benefit, and fail of isolating the disease.—*b*. M. Larrey has advised the *actual cautery* to be applied lightly to different points on the inflamed surface, to the number of forty or fifty, with the view of concentrating the morbid action to the parts, and arresting its extension.—*c*. *Blisters* were employed first by M. Dupuytren with this intention. They are of great service in stopping the progress of superficial spreading and erratic erysipelas. But, even in such, when the complaint is very acute, bloodletting should precede, as Dr. M'Dowel justly states, their application. They are seldom of use in the phlegmonoid form, and never when purulent depôts are likely to be formed. This writer concludes that blistering succeeds best when the inflammation is pale, or in patches, with but little tumefaction or pain; and when proper constitutional treatment precedes and accompanies it. The blister should completely encircle the disease, covering about two inches, from the margin, of the inflamed, and as much of the healthy, surface, or it will extend at the unguarded point.

78. *e*. Mr. Reid and Dr. M'Dowel have given extensive trial to *mercurial inunction* in this complaint, in two of the Dublin hospitals. They concur in viewing it as a valuable remedy, especially in conjunction with such internal treatment as the case may require, in both the constitutional and the traumatic forms, whether affecting the head or the extremities. Two, three, or four applications have generally sufficed, and salivation has frequently come on. Where the ointment cannot be rubbed, it should be daubed, upon the part. The recommendation of M. Ricord, who originated the practice, to use only the recently prepared ointment, is very deserving of attention.

79. *D*. Mr. James mentions in favourable terms the application of *spirits*, and other stimulating substances, to the part. Dr. Peart prescribed a lotion, consisting of a drachm each of the subcarbonate of ammonia and the superacetate of lead, in a pint of rose-water. I have directed epithems of spirits of turpentine with benefit; but morbid secretions should be evacuated, the excreting functions restored, and stimulating diaphoretics and tonics administered internally, before these should be ventured on in the constitutional forms of the malady. They are inadmissible where suppuration appears inevitable, or when vital power is much depressed, and where a tendency to affection of, or metastasis to, internal parts is manifest. In such, the diffusive stimuli are most serviceable given internally.

80. *E*. The introduction of *incisions* into the treatment of erysipelas and its allied affections is considered by all candid practitioners in this country, and by the more recent Continental writers, as one of the greatest improvements in medical and surgical practice, and as *solely* due to Mr. Copland Hutchison. It has been alleged, that the same means were previously recommended by some of the older of modern writers. I have looked into them, in order to ascertain the fact; and have found that, by two or three, superficial scarifications merely have been directed for certain morbid states, but not for erysipelas; these scarifications being quite different from the incisions practised by this author, and such as have been adopted from the earliest ages as a mode of local bloodletting, among the inhabitants of both northern and intertropical countries. Since the publication of Mr. Hutchison's plan, modifications of it have been devised by Dr. Dobson and Mr. Lawrence—a number of minute punctures by the former, and one or two incisions many inches in length by the latter. There is now, I believe, but little difference of opinion among practical men, as to which of the three modes should be adopted. The extensive experience of Drs. Crampton, Young, Macfarlane, and M'Dowel, and others, have decided the question. The last of these remarks that, in phlegmonoid erysipelas, early and free incisions, as advised by Mr. Hutchison, are of the greatest importance in immediately relieving, and speedily arresting, the disease; and in preventing sloughing of the fibrous and other tissues, and purulent infiltration of the cellular substance: their depth and number being proportioned to the extent of the inflammation. The fasciæ should be divided if the disease extend beneath them. The bleeding from the incisions ought to be watched, as it is sometimes profuse; and it may, if uncontrolled, or unaccompanied by a sufficiently restorative treatment, especially in old drunkards and broken-down constitutions, be attended by dangerous results. In these circumstances, and if the disease has been neglected till diffusion of pus in the cellular tissue, or sloughing, has occurred, before incisions have been made, lint dipped in spirits of turpentine, or in equal parts of it and Peruvian balsam, should be applied, and covered by warm poultices. This practice has been prescribed by me for several years; and was resorted to in a most dangerous case attended by Mr. Hutchison, myself, and another practitioner, in the summer of 1834. Applications with the solution of the chlorate of lime, or of soda, or of kréosote, will also be serviceable in cases where sloughing has preceded the incisions or where spreading ulceration attacks their edges, as sometimes occurs in irritable and broken-down constitutions. When phlegmonoid erysipelas attacks the loose cellular substance about the eyes, the rectum, and scrotum, early incisions are requisite. Where the scalp is deeply affected, they should pass through the aponeurotic expansions and pericranium, the bleeding attending them often rendering further depletion unnecessary.

81. In erysipelas supervening in the advanced stages of low or malignant fevers, incisions should be made with great caution, and not unless imperatively required, as the bleeding attending them, although moderate, may induce sudden or even fatal collapse, notwithstanding the contemporaneous administration of restoratives. I lately met with such an occurrence. When suppuration has advanced or extended far, *compression* by bandages, as recommended by Galen, Aëtius, Heister, and more circumstantially by Dr. Dewar, should follow the evacuation of the matter by incision, in order to procure the adhesion of the opposite surfaces of sinuous cavities. But the compression ought to be so

applied, as to give a free discharge to the secretion by the outlet made for it.

82. iv. *Treatment of Erysipelas in Infants and Children.* — *A. a.* In the *early stage* of the complaint, the bowels ought to be kept freely open; *calomel*, or hydrargyrum cum cretâ, either with magnesia or the subcarbonate of soda, being given at first: and, if the fever be high, *James's powder* should be added, cooling diaphoretics exhibited, and leeches applied behind the ears, or over the sternum, especially if there be associated affection of the bronchi or lungs. The infant should be restricted to the mother's milk, and even that ought to be given in diminished quantity. It will often be necessary to administer a stomachic or mild purgative to the nurse, and to attend to her digestive organs, and her diet. — *b.* In the *second stage* of the disease, when suppuration has commenced, the various tonics and stimulants already mentioned — especially bark, quinine, ammonia, and the chlorates — should be freely administered. I have for many years prescribed the chlorate of potash with much benefit in this, and the allied affections. The chloric acid, with decoction of bark, and camphor, is also of great benefit.

83. *c. Blisters* have been favourably noticed by Dewees, Physick, and others; but they require much more caution in this class of patients than in adults. They ought to be applied only for a few hours, or with very fine tissue paper interposed between them and the skin, and be removed as soon as their action commences; when warm bread and water poultices will complete their effect. — *d. Mercurial ointment* is, however, a much more generally appropriate application, particularly in very young children. If vesications cover the part, they should be broken previously to the application (Dewees); and if incrustations have formed, or if suppuration have commenced, the ointment may be applied to the inflamed margin, and a portion of the sound skin. Dr. Dewees states, that Dr. Schott has found a solution of *corrosive sublimate*, in the proportion of a grain to the ounce of water, equally beneficial with the ointment. In other respects, the constitutional and local treatment of erysipelas in infants should be conducted according to the principles developed above.

84. *B.* The *affection of the pudendum* occurring in children two or three years of age, and which Mr. K. Wood considers distinct from erysipelas, is certainly a severe form of this complaint, in very delicate, ill-fed, or cachectic children, or in those labouring under mesenteric or hepatic disease. It is not a rare affection in large or manufacturing towns. Mr. Dendy (*On the Cutaneous Diseases incidental to Childhood*, 8vo. p. 199.), my respected colleague for many years, and myself, have met with several cases, in both sexes, at the Infirmary for Children. In these, the weak and rapid pulse, the pale cachectic countenance, and the appearance of the affected parts, determined me to evacuate morbid matters by stomachic and mild aperients; to support vital power, and thereby to prevent the extension of the disease, by the decoction of bark, with the chlorate of potash, or the medicines already mentioned; and to prescribe applications with the solution of the chlorate of lime or of soda, or with Peruvian balsam.

85. v. *Regimen and Diet.* — *a.* The removal of patients to a *pure atmosphere* is of very great advantage in the treatment; and fresh air should be freely admitted into the apartment, all sources of impurity, admitting of removal, being taken away. — The *diet* should be antiphlogistic in the early stage; and in the more adynamic states of the complaint, it should be light and nourishing, and some agreeable and appropriate stimulant given along with it, as old sherry, or spirits for those who have been addicted to them. Chicken broth, beef tea, arrow-root, with old wine or brandy, become necessary, where suppuration, or destruction of the subjacent tissues, has supervened; but, in the early stages of the phlegmonoid, or where there is plethora, abstinence from food, and from drink, excepting as much of the latter as is indispensable, should be enforced. Whatever is prone to become acid or acrid on the stomach, as rich broths and soups, and all oily and fat matters, ought to be avoided.

86. *b. During convalescence,* change of air; light tonics, with alteratives and mild aperients; warm bathing followed by frictions of the surface, or slightly alkaline baths; due attention to all the secretions and excretions, especially to the biliary secretion; a course of alkalies with small doses of blue pill and taraxacum, when chronic disease of the liver is suspected; regulated diet, with a small proportion of lean animal food once in the day; the utmost temperance, and daily exercise in the open air; are the measures which will most probably secure the patient from a return of the disease, to which he is rendered very liable by an attack. M. Tissot justly advises those who have had the complaint, to avoid the use of cream, milk, rich and viscid food, baked and strong meats, aromatics, warm spices, and strong wines; to shun a sedentary life, and mental irritation; to live on light cooling vegetable diet, and to drink water with a little wine.

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ERYTHEMA. — SYN. Ἐρὺθημα (from ἔρευθος, red), Gr. *Erysipelas*, Celsus and Galen. *Erysipelas idiopathicum*, Sauvages. *Dartre érythémoide*, Alibert. *Die Röthe, Hautröthe*, Germ. *Erythême*, Fr.

CLASSIF. — 1. *Class*, Febrile Diseases; 2. *Order*, Inflammations (*Cullen*). 3. *Class*, Diseases of the Sanguineous Function; 2. *Order*, Inflammations (*Good*). III. CLASS, I. ORDER (*Author*).

1. DEFIN. — *Superficial redness, with burning pain, of a part of the integuments, varying in extent and form, disappearing momentarily on pressure, usually of an acute character, and uninfectious.*

2. I. DESCRIPTION. — The varieties of *erythema* and of *erysipelas* have been confounded together by many writers, — a circumstance almost unavoidable, when it is considered, that several states of the one are merely modifications of certain forms of the other; distinctions between them being rather conventional and artificial, than essential, distinct, and unvarying. HIPPOCRATES used the term erythema merely to signify simple redness of a part. CALLISEN, SAUVAGES, and ROSTAN employed it to designate the slightest grade of erysipelas. J. P. FRANK and J. FRANK applied it to several affections of a chronic kind, entirely distinct from those to which it has been given by recent British and French pathologists. CULLEN viewed it as a superficial inflammation of the integuments, but little, or only symptomatically, affecting the constitution; and erysipelas as an affection primarily, and chiefly of the whole system. WILLAN, BATEMAN, and RAYER considered erythema as generally connected with more or less constitutional disorder, — a circumstance that cannot be disputed, although such disorder is frequently latent, or but little evident. Dr. M. GOOD has detached two of the most common forms of complex erysipelas, viz. the phlegmonoid and œdematous, from that head, and comprised them under this, — an arrangement in so far improper, as intimately allied and serious affections, depending upon very manifest febrile disturbance of the system, are thereby separated, and certain of them placed in connection with others unattended by any marked disorder, and of comparatively little importance. Erythema is either *primary*, and proceeding from local causes; or *symptomatic* of some other disease, or of constitutional disorder.

3. i. PRIMARY OR IDIOPATHIC ERYTHEMA presents various modifications, according to its causes and seat. — *A. Er. Intertrigo*, SAUVAGES, WILLAN — *E. ab Acri inquilino*, CULLEN — *Ecorchure*, Fr. — *Fret, or Excoriation of the Skin* — generally proceeds — (*a*) from the friction of two contiguous surfaces, particularly in fat persons, as in the upper parts of the thighs, arm-pits, &c.; — (*b*) or from the irritation of morbid secretions coming or remaining in contact with parts, as of the perspiration in the groins, and below the mammæ; or of the leucorrheal discharge, or catamenia, and of the alvine and urinary excretions, particularly in the course of other diseases; — (*c*) or from chemical

or mechanical irritants, and artificially from sinapisms, or ammoniacal and terebinthinated liniments, &c.; — (*d*) or from excessive heat, or vicissitudes of heat and cold, or the rapid abstraction of heat — *E. pernio*, or chilblain; — (*e*) or from pressure, especially lying long in one position — *E. paratrima*, Sauvages; — (*f*) or from the stings and bites of insects, &c. — *E. punctura* of Sauvages.

4. When the epidermis is partially removed in this species of erythema, either by friction of the surfaces, or by the excoriation produced by acrid secretions, as in the intertrigo occurring in females and infants of a full habit from neglect of due cleanliness, a serous or sero-puriform fluid exudes from the inflamed surface during some days; but vesicles are not formed, nor is there any manifest swelling of the part as in erysipelas.

5. ii. Symptomatic Erythema — *l'Erythême Symptomatique*, Biett, Rayer, Cazenave, &c. — often accompanies other eruptions, especially at their commencement and termination, as remarked by Billard; and is occasionally complicated with them. It most frequently is dependent upon disorder of the digestive organs; and is often observed in children about the periods of dentition, in plethoric or fat persons, and at the critical periods of female life. It is most commonly caused by the ingestion of irritating substances, and by certain kinds of food, especially in irritable temperaments, feeble or delicate constitutions, and individuals of a peculiar diathesis.

6. *A. Fugacious Erythema* — *E. fugax*, Willan, Bateman — the *maculæ volaticæ* of various writers — consists of irregular and evanescent red patches, with increased heat of the part, which appear successively on the arms, neck, breast, and face, in various febrile diseases, and in bilious fevers and diarrhœa (Bateman); often denoting, as Hippocrates has remarked, a tedious and dangerous malady. This variety sometimes attends derangements of the digestive organs, and, more rarely, hysteria and hemicrania. It is not usually followed by sensible desquamation of the cuticle; but exceptions to this occasionally are observed.

7. *B. Shining Erythema* — *E. læve*, Bateman — is sometimes symptomatic of disorder of the *primâ via*, and occasionally attends the catamenia in delicate and irritable females; but it most frequently accompanies anasarca, or œdematous swellings. The inflamed surface is smooth and shining. When it affects young and sedentary persons, it is often attended by slight fever, and it generally terminates in extensive desquamation as the anasarca subsides; but where it occurs in aged persons, or in those addicted to intemperance, it is liable to pass into spreading or sloughing ulcers. It is merely a modification of œdematous erysipelas.

8. *C. Marginated Erythema* — *E. marginatum* — occurs in patches, bounded on one side by a slightly elevated, tortuous, red border; but the redness has no boundary on the open side. It appears on the extremities and loins of old persons, produces little or no irritation, and remains for an uncertain time. It is generally connected with internal disorder of a serious or dangerous tendency.

9. *D. Papulated Erythema* — *E. papulatum*, Bateman — appears chiefly on the arms, neck, and breast, in irregular extensive patches, and most frequently in females and young persons. The patches are of a bright red hue, often slightly elevated; and, for a day or two, before the colour becomes vivid, they are rough or imperfectly papulated. The redness afterwards continues for several days; and, as it declines, assumes, in the central parts, a bluish or pale purple tinge. This variety is generally attended by a tingling sensation, passing to soreness as the colour changes; and sometimes with much constitutional disturbance, — with a frequent small pulse, anorexia, depression of strength and spirits, watchfulness, and pains or tenderness of the limbs; but the general disorder is often trifling.

10. *E. Tuberculated Erythema* — *E. tuberculatum* — is merely a slight modification or an advanced stage of the *papulated*. The patches resemble those of this variety; but there are small, slightly elevated tumours interspersed through them, subsiding in about a week; the erythema becoming livid and disappearing in about a week more. It commences with fever; is attended by languor, irritability, and restlessness; and is succeeded by hectic. It is so rare, that Bateman never met with it, and Willan saw only three cases; and, in these, treatment did not " alleviate the symptoms nor prevent the subsequent hectic" (Bateman).

11. *F. Nodose Erythema* — *E. nodosum* — affects chiefly females, children, and young persons of a lax and lymphatic constitution; and rarely occurs in boys. It is preceded by slight febrile symptoms, for a week or more, which generally abate upon its appearance. It shows itself on the fore part of the leg, and rarely on the arm, and, in large oval patches, the long diameter of which is usually parallel with the tibia, and slowly rises into hard and painful protuberances. In the course of nine or ten days these soften and subside, the red colour turning bluish or dusky a day or two earlier. It is sometimes connected with the approach of the catamenia; and its premature disappearance is sometimes followed by dangerous internal disease. Mr. Dendy saw pneumonia suddenly supervene on its retrocession.

12. iii. J. Frank and Rayer have described, *as a chronic form of erythema*, the redness affecting parts of the face, and often associated with *Acne*, particularly *A. rosacea*, which it sometimes so nearly resembles, as to appear rather as a modification than as a complication of that eruption.[*] It generally commences in the nose, extending to the cheeks, and more rarely to the forehead and chin; is characterised by vascular arborisations in the alæ nasi and summits of the cheeks, with shining redness disappearing momentarily from pressure; and is attended by a sensation of heat, tension, and itching, which, with the redness, are increased by external and internal stimulants, or whatever determines the blood to the head; and,

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[*] Nicolaus Nicolus Florentinus took a tolerably accurate view of these complaints, in making them varieties or degrees of the same eruption. The one here described, he names, " *Rubedo simplex seu facies rubra*;" the *Acne rosacea*, he calls " *Rubedo pustulosa*" (*Serm.* vii. tr. vi. cap. 15.): and T. Mayerne was, upon the whole, right in connecting the former with disorder of the liver (*Opera Medica*, p. 213.), and in prescribing for it, local depletions from the nape of the neck, and behind the ears, setons, mercurial purgatives, antimonials, &c.

at first, by slight exfoliations of the cuticle. The reddened skin, at much later periods, becomes irregularly granulated, rough, thickened, and occasionally tuberculated. It is dependent upon protracted disorder of the digestive organs, usually resulting from a long course of indulgence or intemperance, and seldom appears till after middle age.

13. iv. M. Alibert describes two other species of erythema, — the *Epidemic* and *Endemic*. The *former* is characterised by burning itching, with pricking in the hands and feet. In some cases, the skin is red; in others, it is black, as if covered with a layer of soot. The epidermis exfoliates, or forms vesications; and the constitutional symptoms are very severe. This disease was epidemic in Paris in 1828. The *endemic* is the chronic affection of the skin, which attacks the peasants of the north of Italy, and is better known by the name of Pellagra (*which see*).

14. II. The Causes, particularly of primary erythema, have been already noticed (§ 3.); but, even when appearing in this manner, it is favoured, if not in a great measure caused, by disorder of the digestive and excreting organs. It often accompanies dentition and diarrhœa in children; and, in them especially, is frequently caused by particular kinds of food, or by errors in diet. It sometimes appears in the course of dysentery or fevers; and is indicative of inflammation or suppuration below fasciæ, or in deep-seated parts; it then generally assuming the shining or smooth form. Vascular plethora; the critical epochs in females; various irritating ingesta; very warm spices; disorder of the stomach, liver, and bowels, or of the excreting or eliminating functions; are chiefly concerned in its production.

15. III. Diagnosis. — *A*. The superficial redness; the absence of tumefaction and vesication; the more or less circumscribed patches; the much less constant, severe, and burning pain; the generally slight form, and favourable termination, of both the local affection and the constitutional disorder; sufficiently distinguish erythema from *erysipelas*. — *B*. The redness is deeper in shade and in situation, and the patches are larger, but less numerous, in erythema than in *Roseola*: the latter eruption often appearing simultaneously in different parts of the body, which is never observed in the former. These two affections are, however, often distinguished from one another with difficulty; and there can be as little doubt, that they often insensibly pass into each other, as that they are both symptomatic of internal disorder; as, indeed, Mr. Plumbe has properly observed.

16. IV. Treatment. — *A*. The *primary* or *idiopathic* forms generally disappear readily upon the removal of the causes which occasion them; aided by frequent tepid ablution, and by some mild absorbent powder, as that of calamine or of cerussa. When erythema occurs *in infants*, from inattention to the removal of the urinary and intestinal excretions, the tepid semicupium, mild aperients, and saline diaphoretics, may also be employed; and if it be attended by a serous or fœtid discharge, a lotion with a weak solution of the chlorate of lime or of soda, or of kréosote, will readily restore the parts to a healthy state. If the part be very irritable, Dr. Bateman directs a lotion consisting of ten grains of oxymuriate of mercury and six ounces of lime-water. A weak solution of the nitrate of silver is also of great service. — When it is produced by cold — *E. pernio* — turpentine and the balsams, or the former and tincture of camphor, soon remove it. — If it be caused by bites or stings of insects, ammonia and the essential oils are generally beneficial. — *Erythema from pressure* may be removed by the use of air-pillows; by spirituous, camphorated, or terebinthinated applications; and by suitable means of protecting the surface.

17. *B*. The *symptomatic states of erythema* should be treated according to the indications of internal disorder furnished by individual cases; and almost entirely by internal or constitutional means. The principles advocated in erysipelas, viz. that the excretions should be promoted, and the digestive and assimilating functions assisted, ought also to be followed in these affections. Therefore, deobstruent and alterative purgatives; mild tonics, with the alkaline subcarbonates, and diuretics; diaphoretics with sedatives, particularly at bedtime, as James's powder with small doses of calomel and opium, or hyoscyamus, are the most generally appropriate. In the *papulated variety* (§ 9.), gentle laxatives, mild tonics, and light diet, are sufficient; but, when local irritation, or restlessness, is much complained of, antimonials and anodynes may also be given at night. — The *nodose variety* (§ 11.) is soon removed by rest; small doses of mercurials, with James's powder, at bedtime; alterative mild purgatives given in the morning; and light tonics in the course of the day. Change of air and light diet are also of very great benefit. External applications are seldom useful, and may be hurtful. If this or any of the other varieties be connected with suppression of the catamenia, or of other discharges, bloodletting should precede the means recommended above; and measures ought to be used to restore the evacuation.

18. *C*. *The chronic form of erythema* (§ 12.) should be treated in the manner advised in the article Acne (see § 23. *et seq.*), particularly for the *indurated* and *rosaceous varieties*, with which this form is often associated. Temperance; light mild diet; regular exercise; avoidance of stimulating and heating ingesta, especially hot spices, spirituous liquors, acescent vegetables, and fat meats; mild tonics and laxatives, with the alkaline subcarbonates; and frequent and very small doses of blue pill, or hydrargyrum cum cretâ, with taraxacum, &c.; constitute the most appropriate remedies. Astringent or other repellent washes are of use only at the commencement of the eruption. When it has become more diffused or chronic, it is not much affected by these applications; and if it were, the propriety of suppressing it by such means would be very questionable. When first appearing, the washes mentioned in the article Acne, and a solution of borax in weak pyroligneous acid, are most useful. The severer forms of erythema, especially the shining, or œdematous, and the tuberculated, should be treated in the manner recommended for similar states of erysipelas; and the *regimen and diet* directed in that article ought to be adopted in this disorder.

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EXANTHEMATOUS DISEASES. — Syn. *Exanthemata.* Ἔξανθημα (from ἐξανθέω, I break forth, or effloresce). *Eruptive Fevers, Exanthems.*

Classif. — 1. *Class*, Febrile Diseases; 3. *Order* (*Cullen*). 3. *Class*, Dis. of Sanguineous Functions; 3. *Order* (*Good*). The 3d *Order*, of *Willan* and *Bateman*. III. Class, III. Order (*Author*, in *Preface*).

1. Defin. — *Diseases usually arising from specific causes, and capable of perpetuating their kind; evincing, at their commencement, diminished vital power and function, followed by reaction throughout the vascular system; but expressed chiefly in the mucous surfaces and skin, especially in their earlier stages.*

2. The term ἔξανθημα was employed by the ancients to signify any cutaneous eruption, whether acute or chronic, febrile or non-febrile; and a similar extension of its signification is very generally observable among medical writers until the commencement of the last century. The nosologists who wrote about the middle, or towards the close, of that century, either differed very remarkably as to the diseases which should be ranged under this order, or did not separate them from other febrile or inflammatory complaints. Sauvages, one of the earliest to make the distinction as to classification, placed the exanthemata as the *first order* of his *third class, Inflammations;* and comprised *plague, small-pox, pemphigus, measles, miliary fever, purpura, erysipelas, scarlatina, essera,* and *aphthæ.* — Sagar arranged the same diseases into one *class*, which he divided into *two orders*, viz. *contagious* and *non-contagious* exanthemata; *miliary fever, erysipelas, essera,* and *aphthæ* constituting the latter order. — Macbride made the exanthemata the fourth order of the *class, Fevers;* and omitted *purpura* and *essera*, on account of their non-febrile characters. — Cullen added to the eruptive fevers of Macbride's classification, *chicken-pox* and *nettle-rash.* — Selle retained the more extended signification of the term, and distinguished *two orders* — the *acute* and *chronic:* the former embracing the diseases enumerated above; the latter, various chronic eruptions. — J. P. Frank formed his *third class* of the exanthemata, and distinguished them into *two orders:* those with little elevation of the cuticle, as erysipelas, scarlatina, petechiæ, &c.; and those in which the skin is rendered scabrous, as variola, rubeola, &c. — Parr arranged them as the *first genus* under his *third order, Eruptions;* added *strophulus* and *achor* to those already mentioned; and made a distinction between those appearing epidemically, and those which never assume this form. — K. Sprengel comprised them in his *third book* or *class;* but, whilst he omitted plague, erysipelas, miliary fever, and aphthæ, he introduced *scabies* and *herpes.*

3. Willan and Bateman, in their artificial classification, restricted the term to *measles, scarlatina, urticaria, roseola, purpura,* and *erythema;* and Dr. Good extended it to the diseases admitted by Sauvages, with the addition of *urticaria, vaccinia,* and *yaws.* — Rayer, Cazenave, and Schedel have merely substituted *erysipelas* for purpura, in modifying the arrangement of Willan. Alibert has enumerated in this, his *second group or order*, variola, vaccinia, clavus, varicella, nirlus, roseola, rubeola, scarlatina, and miliaria. Two of these he has introduced into this group for the first time — viz. *clavus* and *nirlus.* The former is a febrile exanthema peculiar to sheep, very contagious, and characterised by flat circular pustules, resembling nail-heads, which appear on the parts least covered with wool, and which, like variola and vaccinia, attacks only once during life. The nirlus — the nirles of Scotland, consists of distinct prominent papulæ, of a dull red colour, appearing after ephemeral fever, never suppurating, but terminating by absorption, or by desquamation. The febrile exanthemata formed the *third order* of the *third class*, in the outline published by me in 1822. — Lastly, Dr. Weatherhead admits only rubeola, scarlatina, variola, vaccinia, varicella, and Frambœsia in his order of Exanthematici. — Other systematists, as Vogel, Ploucquet, Pinel, and Young, have not arranged the exanthems into a distinct group; but have classed them either with fevers or with inflammations. I have divided them into *two sub-orders*, viz. (*a*) those which attack the same person only once; and (*b*) those which may occur oftener than once; and have referred to a different order, such rashes, as erythema, roseola, and urticaria, as are chiefly sympathetic of disorder of the digestive organs.

4. There are various circumstances connected with all the diseases which I have classed as exanthematic, requiring to be constantly kept in mind by the practitioner: — 1st. They frequently prevail epidemically; — 2d. Different epidemics of the same malady often present very different or even opposite characters, chiefly as respects the state of vascular action, and of vital power and resistance; — 3d. The sporadic occurrences of the exanthemata are generally less severe or dangerous than their epidemic prevalence, although, occasionally, the latter is very mild; — 4th. Like all other febrile diseases, the severity of attack, the complications sometimes appearing in their course, and their terminations, depend in great measure upon the constitution and habit of body, upon pre-existing disorder; upon the occupation of, and other circumstances peculiar to, the individual; and upon the season of the year, and the treatment adopted at the invasion and in the early stages of the disease; — 5th. As these maladies, when once formed, run a determined course, a too perturbative treatment, or the *nimia medici diligentia*, particularly if misdirected or otherwise injudicious, may be more injurious than inactivity, or the unaided efforts of nature; — 6th. That we should protect vital organs from suffering injury, either from the reaction attending certain of their stages, or from the congestion

accompanying others of their periods; and, by endeavouring to interpret the procession of morbid phenomena aright, to follow where Nature points the way, and in the manner she indicates, in particular cases; in other words, that we should not treat the disease as a substantive, or entity, to which certain ideas are attached, but according to the actions, changes, and states presented at the commencement, and during the progress, of each case; — 7th. The advanced stages of, and convalescence from, the exanthemata require careful supervision; as, during the latter period, various affections are liable to supervene, that are sometimes more dangerous than the antecedent malady; — 8th. Opinions as to the result should generally be given with reservation, as sudden and unexpected changes may occur during their course, and during recovery, owing to moral and physical causes, over which the physician can often exercise no control.

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EXCRETION AND EXCRETIONS.—

(Classif. Pathology — *Ætiology* — *Symptomatology.*)

1. Defin. — *Excretion is the separation of substances from the living body; and the secretions or substances separated are the fæcal parts of the ingesta, and the matters which have fulfilled their destined purposes in the frame; and which, being no longer suited to, or susceptible of, vital alliances, are eliminated from the blood in gaseous, vaporous, or liquid states; their discharge being necessary to the continuance of health, and being performed under the influence of life.*

2. A knowledge of the various functions excreting or eliminating effete matters from the blood, of the manner in which they are influenced by foreign agents, and of their mutual actions and reactions, is necessary to a philosophical and successful exercise of the healing art. The continued introduction of matters into the frame, and their temporary circulation and assimilation, is counterbalanced by a corresponding discharge; the substances received being, after indefinite periods, excreted in very different states of elementary combination. Matters are introduced into the frame almost entirely by the digestive and respiratory surfaces; they are discharged also by these surfaces, and by other channels almost exclusively appropriated to this function. I shall take a view, *first*, of the several excreting functions; and, *next*, of the manner in which their interruption or suppression affects each other, and disorders the vital actions.

3. The Excretions are either — (*a*) The Natural, or those which are ejected altogether from the body, as the fæces, urine, &c.; and which may be divided into — *α. exhaled*, as the transpirations from the skin and lungs; *β. secreted*, as the urine, &c.; and, *γ. fæcal*, consisting not only of exhaled and secreted fluids, but also of those parts of the ingesta which remain after the process of digestion is completed; — (*b*) The Morbid, or those — *α.* which are *imperfectly ejected* from the circulation, as the fatty matters which accumulate in situations where they do not materially interfere with the vital actions; and, *β.* the most remarkable *alterations from the healthy state* presented by, or attending, the excretions discharged by natural channels.

4. *I.* The Natural Excretions, the *excretions proper*, or *those matters which are ejected altogether from the body.*— *A. Exhaled Excretions.* — *a.* The *cutaneous transpiration*, whether in its more insensible states of aqueous vapour and carbonic acid, or in the form of sweat, is a most important evacuation. It consists chiefly of water, with oily matter, mucus, osmazome, lactic or acetic acid, and the salts usually found in the blood (Thenard, Berzelius, Anselmino, Tiedemann). When the large quantity of fluid discharged from the blood by this channel is considered, interruption or suppression of the function will manifestly appear most injurious; and calculated either to disorder other excreting functions, or, if these do not perform a compensating action, to induce febrile or inflammatory affections. The *causes* which chiefly affect this excretion are stated in the article Disease (§ 41. 101.).

5. The *quantity* of this evacuation may vary remarkably; and its *quality* may also change.— It is suppressed or much diminished in the early stages of febrile and inflammatory diseases, especially during the period of excitement; and is either restored or greatly increased as the excitement passes into exhaustion. When it becomes abundant, it is often a salutary crisis; unless in hectic fever, in hæmorrhage, or in acute diseases attended by sinking, and coldness of the surface. Copious perspiration accompanies healthy action and excitement, and then it is warm and general. It is most profuse in the advanced stage of consumption; and in some malignant diseases, as pestilential cholera, &c. It is sometimes fœtid, or contains more animal matters in solution than usual; and is at the same time more abundant, particularly in persons who are habitually costive, or who eat and drink largely or grossly; and still more so in the negro: in all whom, the suppression of the excretion is often followed by dangerous maladies. Profuse as well as offensive perspiration, particularly of the feet, also attends imperfect action of the liver or kidneys; whilst unusual heat and dryness of the feet, and of the palms of the hands, accompany chronic inflammation of these and other internal viscera. In *negroes* and the dark-skinned races, the integuments are a much more important organ of excretion than in the white variety — the perspiration, both sensible and insensible, of the former being very much more abundant, and containing more carbonic acid and animal matter, than that of the latter. I fully ascertained this fact by experiments made in Africa, in 1817; the cutaneous transpirations of the negro being from one fourth to nearly one half more abundant than that of the European. — Besides the matters usually found in it, the perspiration sometimes contains the colouring matter of the bile, or bile itself, especially in hepatic diseases and bilious fevers;

and, occasionally, minute quantities of urea and uric acid. It is very sensibly affected, particularly in costive habits, by the ingesta, especially some kinds of fish, and shellfish; the odour of these, and of numerous other articles, being very sensibly felt in this excretion.

6. *b. The Pulmonary Exhalation.* — *a.* The *carbonic acid gas* given out during respiration, is one of the most important excretions that takes place in the economy, whether this acid be formed within the blood-vessels, or in the air-cells, of the lungs; the quantity of it produced being an index of the extent to which the change from venous to arterial blood is carried in this organ. The evidence as to whether the carbonic acid is formed *within* the blood-vessels, or *without* them, is very contradictory. The experiments of Dr. EDWARDS show that the former process takes place to some extent; and they are supported by the fact observed by BERZELIUS, that blood, especially its colouring part, absorbs oxygen very quickly, and retains some part of the carbonic acid thereby produced. The passage of carbon from the vessels, and its combination with oxygen externally to them, is an inference from the experiments of Mr. ELLIS; which, however, were performed out of the body, and under circumstances which entirely excluded the operation of the vital influence. The evidence, however, for the absorption of oxygen through the capillary parietes is nearly the same with that for the excretion of carbon; for, if the tissue intervening between the blood and the air will permit the transmission of the one, it may also allow the passage of the other. I am inclined to think that both operations go on simultaneously: that, whilst a portion of the carbonic acid gas is given out from the blood, it is accompanied with a portion of free carbon, or oxide or hydrate of carbon, which combines with an additional quantity of oxygen in the lungs, and thus forms the whole of the carbonic acid in question; and that, at the same time, a portion of oxygen is absorbed, which combines with a portion of carbon in the blood; and there forms the carbonic acid, or the oxide of carbon, which is a part of the matters discharged from the blood in the lungs. These processes may vary, and either may predominate, according to the state of vital influence at the time, under whose control they are placed. This view is supported by the experiments of Dr. EDWARDS, which show that the carbonic acid is not formed instantaneously in the lungs; but is, to a considerable extent, secreted from the blood in the respiratory surfaces. Nor is it contradicted by the experiments of MM. MAGENDIE and ORFILA; who found that phosphorus, dissolved in oil, and injected into the blood, was secreted by the lungs in the form of phosphorous acid vapour.

7. However formed, it is obvious that the carbonic acid should be viewed as an excretion from the blood, the combination of the carbon with the oxygen being the principal source of animal heat. The quantity of the gas thus excreted, necessarily varies with the size of the thorax, the activity of the circulation, the state of nervous energy, and the condition of the excreting organ. Dr. CRAWFORD first found the quantity of the carbonic acid discharged, much diminished in a high temperature; and LAVOISIER, SEGUIN, PROUT, FYFE, and myself confirmed the observation. In the experiments I made in an artificial high temperature in this country, and in nearly the same temperature in a hot climate, the diminution was very remarkable, more especially in the latter circumstances; the humid and miasmatous air of an unhealthy intertropical country depressing vital and nervous power, and thereby diminishing still further this important function.

8. *β.* Other gases are exhaled from the lungs, as shown by the experiments of NYSTEN and EDWARDS. The former found that, when these are injected into veins, they pass out with the expired air; and the latter concludes that azote, absorbed into the blood, is discharged from it by the lungs. It is probable, however, that a considerable portion of the azote which passes into the circulation during respiration, combines with the chyle, and contributes to its complete animalisation; the ultimate product being urea, which is excreted by the kidneys. From experiments I performed many years since (*Lond. Med. and Physical Journ.* vol. xlvi. p. 107. 185.), I inferred that numerous substances, as camphor, spirits of turpentine, several essential oils, spirits, æthers, &c., when absorbed or otherwise introduced into the circulation, are discharged from it chiefly by the lungs. Spirituous liquors, taken largely, pass off in great part through this channel — at least, their more volatile portions.

9. *γ.* The *aqueous vapour* constantly *transpiring* from the lungs is often a most important evacuation. It is slightly charged with animal matter; and proceeds chiefly from the blood in the pulmonary artery. Its quantity varies very much. LAVOISIER, SEGUIN, and THOMSON estimate it at about twenty ounces in the twenty-four hours: but it is increased much above this, by the free use of diluents, and malt or spirituous liquors, particularly the last; or by whatever increases vascular plethora. Diminished excretion by either the skin, kidneys, or intestines, also augments it; and, in these circumstances, it contains more animal or effete matters, to which, chiefly, is owing the fœtor of the breath so often remarked; the lungs, in these cases, compensating in some measure for the interruption of the other excreting actions. The circumstance of various substances, that are absorbed into the circulation, being eliminated from it, along with the pulmonary transpiration, explains their influence in diseases of the air-passages, and their action in promoting expectoration. The morbid conditions of these passages, especially such as impede the functions of transpiration — whether gaseous or vaporous — must necessarily influence the other excreting actions, particularly those of the skin, of the liver, and the intestinal canal. Hence the advantages, in such cases, resulting from the remedies which promote those evacuations, and restore the pulmonary functions.

10. *e.* The *Catamenial* or *Menstrual Discharge* may be considered as an excretion, most salutary in its effects in most instances. It diminishes both local and general plethora; and it sometimes seems to be the channel by which morbid states of the circulating fluid are removed. In such cases, the discharge is offensive, or altered in colour; and, occasionally, it induces irritation or excoriation of the parts over which it passes, or with which it remains a short time in contact; the cutaneous surface and countenance being

clearer, and the health improved, after such evacuations, particularly when copious, and when the indications they furnish are properly followed. The *lochia* is also a salutary excretion, inasmuch as vascular fulness and local determinations are obviated by it, and the circulating fluid rendered more pure. (See PUERPERAL STATES.)

11. *B. The Secreted Excretions.* — *a.* The *biliary secretion* is *excrementitial* as well as recrementitial; the liver manifestly compensating for the deficient excreting action of the lungs — as was first shown by me in 1815 — and combining a portion of the carbon, and other matters usually discharged from the lungs, into bile, preliminary to their excretion, as well as for the purposes of digestion; that portion of carbon, which does not combine with oxygen to form carbonic acid, being associated with the other constituents of bile in the formation of this fluid. Hence the abundant secretion of bile in circumstances which diminish the activity of the respiratory functions, as in warm moist states of the air, &c.

12. *b.* The *Urinary Excretion.* — MM. DUMAS, PREVOST, and SEGALAS, found, on examining the blood of living animals whose kidneys had been extirpated, that it contained *urea*, the quantity of which was increased according to the duration of life after the operation; and that this substance could not be detected in the blood of those animals in which the urinary secretion was interrupted. M. SEGALAS, having injected an aqueous solution of urea into the veins, observed the secretion of urine rapidly increased by it, and this substance so quickly eliminated in the process, that, after twenty-four hours, it could not be detected in the blood. It seems, therefore, not improbable that the effete and more highly animalised matters absorbed and carried into the circulation, are converted, by the influence of the vessels and organs through which they circulate, into the substance called urea; and that one of the functions of the kidneys is to eliminate it from the circulation. These experiments favour the conclusion that urea is not formed, or at least altogether formed, in the kidneys, by their appropriate actions; but that it, and probably other substances which are removed by these organs, exist in the blood, either already formed, or in certain stages of formation.

13. According to BERZELIUS's analysis, the urine contains, in its healthy state, somewhat more than 30 parts in 1000 of urea; and Dr. PROUT has shown that nearly one half of urea consists of azote. It consequently follows that the injurious accumulation of azote in the system, contingent either on assimilation or respiration, and the resulting putrefactive tendency of the fluids, are prevented by the action of the kidneys. Hence we observe the great proportion of urea in the urine of those who eat much animal food, in which nitrogen abounds; and we may therefore conclude, that the kidneys are the great outlet for azote, as the lungs and liver are for carbon.

14. *C. The Fæcal Excretions.* — *a.* In their course through the small intestines, the alimentary matters are deprived of their chyle; the residue being poured into the cæcum, where its course is more slow, and where it assumes new characters. The contents of the colon and rectum evidently consist — 1st, of the residue of the aliments; and, 2d, of the excrementitial parts of the secretions poured into the digestive canal. These constitute the fæces. It is, in some measure, owing to the quantity and properties of these latter, especially the biliary and follicular secretions, that the fæces present distinctive characters; their *consistence* depending upon their retention in the large bowel, and upon the quantity of exhaled and secreted fluids poured out in this, and the superior portions of the canal. Their *colour* is owing — 1st, to the abundance and properties of the bile, or to its suppression; 2d, to the fluids poured into the digestive tube; 3d, to acidity in some portion of the prima via; 4th, to the food and drink; and, 5th, to the properties of medicinal substances. A careful consideration of each of these is necessary, in estimating aright the indications furnished by the fæcal discharges. The *odour* of the fæces depends chiefly upon the secretion of the mucous follicles, particularly those of the cæcum, colon, and rectum; upon the states of constitutional and vital power, in connection with vascular action, and the conditions of the digestive canal; and upon their retention in the large bowels: an offensive or unnatural odour of the fæces generally proceeding from depressed vital energy, or long retention, and the extrication or secretion of gases in the intestinal canal.

15. II. MORBID EXCRETIONS. — *A. The Fatty Excretions* consist of the secretion of fat — 1st, in cellular parts; 2d, in the alimentary canal; 3d, by the kidneys; and, 4th, by the stomach. — *a.* I have stated in the article ADIPOSE TISSUE (§ 3.), in how far the excessive secretion of fat may be considered as a salutary excretion, in the circumstances which usually give rise to it; the excess of oily or fatty matter in the blood, consequent upon imperfect sanguifaction and assimilation, being deposited principally in the areolæ of the cellular tissue, whence it may be taken up by the absorbents for the purposes of nutrition, when the supply of food becomes deficient.

16. *b.* In some states, chiefly of disease, fatty substances are excreted *from the intestinal canal,* in a solid, semifluid, or liquid form.—1st. In some cases, the fat seems to be absorbed from the adipose tissue, carried into the circulation, and secreted or exhaled from the intestinal mucous surface; whence it is excreted of various consistence, according to the preponderance of certain of its elements, or to its combination with mucus or with an acid in the bowels.—2d. It may also proceed from an undue accumulation, owing to imperfect assimilation, of oily matter in the blood; which is excreted in this situation, instead of being secreted in the adipose cellular tissue: and, 3d. In those instances, where the fatty substance consists of small solid pieces, and resembles or approaches adipocire or cholesterine, it may be secreted in the liver. Cases of this morbid excretion are comparatively rare; but I am convinced that they would be much more frequently observed, if the alvine evacuations were more attentively examined than they generally are. I have met with only two cases; but several have been lately observed by Dr. ELLIOTSON, Dr. BRIGHT, and Mr. LLOYD. It should, however, be borne in mind, that olive and castor oils, in passing through the digestive canal, are some-

times so altered by combining with mucus, or with morbid secretions, as to assume a solid and fatty appearance; and that persons who eat largely of fat meats, occasionally pass portions of undigested fat, in either a fluid or consistent state.—In the cases recorded by MOEBIUS, MOELLENBROCK (*Ephem. Med. Phys. Germ. Curios.* dec. i. cen. 2. obs. 20.), and FABRICIUS HILDANUS (*Obs. et Curat. Med. Chirurg.* cent. iv. obs. 47.), emaciation appears to have been a prominent symptom; indicating the probable origin of the discharge in the rapid absorption of fat from the adipose tissue. Instances of fat voided from the bowels in large quantities are adduced also by TULPIUS (*Observ. Med.* Amst. 1685.), ARNOT (*Edin. Med. Essays,* vol. v. part ii. p. 652.), SCOTT (*Edin. Med. Comment,* vol. iv. p. 334.), BABINGTON (*Philos. Trans.* for 1813. part ii. p. 150.), Mr. HOWSHIP (*Pract. Observat. in Surgery and Morb. Anat.* p. 283.), CULLERIER, EASTCOTT (*Med. Gaz.* vol. xii. p. 49.), and Dr. TURNER (*Trans. of Med. and Chir. Soc.* vol. xviii. p. 73.).

17. In the first case detailed by Dr. ELLIOTSON (*Trans. of Med. and Chir. Soc.* vol. xviii. p. 76.), the fatty matter discharged was fluid, of a yellow colour, concreted when cold, and burnt with a large flame, like oil. It was generally evacuated with the fæces, in large quantity; and occasionally it ran from the patient involuntarily. The discharge was preceded by bloody stools, was continued for several months, was attended by great pain, and was associated with phthisis and mellitic diabetes; pus being thus evacuated from the lungs, saccharine urine from the kidneys, and fat from the bowels, at the same time. On *dissection,* all the intestines appeared greasy, as if soaked in oil, with numerous black points in their mucous membrane; but there was no other lesion in them. The liver was healthy, and the gall-bladder full of thick dark bile. The pancreatic duct, and large lateral branches, were filled with white calculi. The kidneys were sound, the lungs tuberculated and ulcerated. In the second case adduced by Dr. ELLIOTSON, the fat was discharged in both a solid and fluid state. The patient died of this complaint and phthisis. No disease was discernible after death, in the alimentary canal or urinary organs. The liver was large and pale, but healthy in structure; and, with the gall-bladder, destitute of bile. Dr. PROUT (*Ibid.* p. 79.) saw a young lady, who voided, "for many months before death, fatty matter in large quantities, mixed with blood and other things." The cæcum was found thickened; and the mucous coat of it and of the colon was ulcerated. The other abdominal viscera were healthy.

18. In the first of the cases detailed by Dr. BRIGHT (*Trans. of Med. and Chirurg. Soc.* vol. xviii. p. 3.), the fatty matter was observed in the stools, in the course of diabetes, on which jaundice had supervened from obliteration of the common bile-duct, caused by disease of the pancreas, with malignant ulceration of the duodenum. The second instance of this kind of excretion recorded by this physician was remarked during jaundice caused also by obliteration of the common bile-duct, owing to disease of the pancreas and malignant ulceration of the duodenum. In the third case, a nearly similar association of morbid phenomena, and of organic lesions, to those characterising the second, was observed. In the case detailed by Mr. LLOYD (*Ibid.* p. 57.), the excretion of fat in the stools was remarked in the course of jaundice caused by enlarged pancreas; the gall-bladder and hepatic ducts being greatly distended with bile, and the common and pancreatic ducts obliterated.

19. I was recently called to a married female of about forty, who had never been pregnant, and who complained of symptoms which I attributed at first to the passage of gall-stones along the ducts, and afterwards to a concretion in the bowels. Upon examining the evacuations, with the expectation of detecting something of this kind, two lumps were found, the largest of which was above the size of a walnut. They were of a whitish colour, with a slight greyish green tinge, were greasy to the touch, imparted a permanent greasy stain to paper, resembled adipocire in consistence, and burned with a whitish blue flame and much smoke. After their evacuation, much relief was procured, and the opportunities of examining the evacuations ceased; but the patient, who occasionally calls at my house for advice, still complains of disorder of the digestive organs, particularly of the liver and bowels. In the autumn of 1833, I saw, through the kindness of Dr. O'DONNELL, a most able physician in Liverpool, a lady who had long suffered chronic disease of the bowels, particularly of the large bowels. The evacuations, which were fluid, contained a number of small lumps, varying from the size of a split pea to that of a bean; but presenting all the characters just described.

20. *b.* The excretion of fatty matter by the *urinary organs* is more rare.—Dr. PROUT, in a communication to Dr. ELLIOTSON, states, that he has seen, several times, a fatty or adipocirous matter voided with the urine; and that, in every instance, malignant disease of the kidney or bladder has supervened, and ultimately proved fatal. TULPIUS mentions a case of an old woman who *voided fat from both the bowels and bladder,* and died remarkably emaciated. Mr. PEARSON, in Dr. ELLIOTSON's interesting paper, details the case of a lady of seventy-nine, who, after suffering from gall-stones, observed in her stools, which were without bile, a fatty substance, that passed in the form of oil, but quickly concreted; and in her urine a similar oil, which floated on its surface, and concreted like that passed from the intestines. The quantity excreted by the bowels averaged an ounce and a half daily; and by the urinary organs, about the third of an ounce. The patient died emaciated, but no inspection was allowed.

21. *c.* A case is given, in the *Medico-Chirurgical Review* for July, 1826, from the *Annali Universali,* of a man who, after irregularities of diet, was seized with vomiting every week or fortnight, for two years. During an unusually severe attack, occasioned by great imprudence in diet, a quantity of pure blood, and a thick oil, or melted fat, were thrown up; amounting in all to thirty pounds in twenty-four hours. He nearly sunk; and his skin hung in folds, as though all the fat had been absorbed. After some time he was restored to health. It is reasonably supposed that his fat had been rapidly absorbed during the attack of vomiting, and

poured into the stomach. Diemerbroeck (*Observ. et Curat. Med. Cent.* obs. 93.) minutely details the case of a female of twenty-seven years of age, who was long afflicted by violent gastrodynia, and obstinate vomiting of a black fluid containing lumps of fat of the colour and consistence of butter. The bowels were costive; but the uterine, biliary, and urinary functions were not deranged. She was ultimately cured by cathartics, enemata, and cordial anodynes. Instances of the ejection of fatty matters from the stomach, after prolonged or repeated vomiting, and without the possibility of a foreign origin, are recorded also in the *Philosophical Transactions* (for 1673, No. 96.), and by Gesner (*Beobachtungen*, b. i. No. 10.), Gourrand (*Journ. de Méd.* t. lxxxv. p. 366.), and J. P. Frank (*De Cur. Hom. Morb.* l. v. pars. ii. p. 370.)

22. From a consideration of the circumstances attending the excretion of fatty matter from the digestive and urinary organs, in the cases now referred to, the inference that it takes place in one or other of the three modes already stated (§ 16.), according to the nature of the disease in the course of which it supervenes, seems to be well founded. The fact, that the milk-like state of the serum of the blood, so often observed, depends upon the admixture of animal oil or fat in it, remarkably favours the inference as to the first and second of these sources of the fat found in the excretions. The opinion entertained by Sir E. Home (*Philos. Trans.* 1813, part ii. p. 150.), and attempted to be proved by experiments, that the fat is formed in the lower intestines by means of bile, is disproved by the cases recorded by Dr. Bright and Mr. Lloyd. The passage of bile into the digestive canal was completely prevented in all these. But the inference, that imperfect digestion and assimilation, and the consequent formation of oil in the blood, or the absorption of it from the adipose tissue into the circulation, and its excretion from the blood by the bowels, are the true source of this phenomenon, is fully evinced by the history of these, as well as of the other cases. The presence of oil in the urine, remarked in rare instances, is a further proof of the origin now contended for. There is strong reason to believe that the excretion of superabundant oil in the blood takes place much more frequently than is supposed, by this latter channel. Hippocrates, Galen, Prosper Alpinus, and several other writers, noticed it as an unfavourable occurrence, and not incorrectly considered it as a symptom of colliquation.

23. *B. The most remarkable changes presented by the excretions through natural channels* are described in the articles Blood (§ 115. *et seq.*), and Disease (§ 99. *et seq.*), and in the numerous articles on diseases in which the excretions are early or principally affected. The more isolated and prominent of them only will therefore be noticed at this place. — *a.* The *fæcal excretions* are either diminished or increased, or otherwise changed; alterations of these being generally connected with disorder of the hepatic organs. Obstructed or diminished discharge of bile, arising either from torpor of the liver, from congestion, or from obstruction of the ducts, &c., deranges not only the intestinal functions and excretions, rendering the latter pale and offensive, but also the digestive and assimilative actions, the urinary and perspiratory functions, and the conditions of the nervous system, occasionally terminating in coma and death; especially when the bile has been taken into the circulation, and has coloured the tissues and exhaled fluids. The bile may be so altered in colour and consistence, owing either to the superabundance of certain of its elements in the blood, or to its remora in the ducts and gall-bladder, and to the consequent changes, as to impart to the fæces a very dark green or almost black colour, even independently of the exhalation of blood in the prima via. I have remarked this uncommon state of the fæcal discharges chiefly in diseases impeding respiration, as asthma, bronchitis, hydrothorax, and chronic affections of the liver. A black appearance of the alvine excretions is, however, more frequently produced by the escape of blood into the upper portions of the alimentary tube; but upon diluting or mixing the evacuation with water, a greenish hue will be assumed in the former case, and a reddish or ochry tint in the latter. The remarkably copious, rice-coloured, watery evacuations in pestilential cholera, are attended with an albuminous coating of the intestinal mucous surface; the serum of the blood having exuded from this surface, owing to deficient vital power of this part, and of the frame generally, and to a morbid state (dyscrasy) of the blood itself; its albumen partially concreting on, and adhering to, this surface, as proved by the examination of bodies, in which treatment had not removed it previously to dissolution. The fæcal excretions are more or less altered in most diseases; but it would lead to repetitions to pursue the subject further at this place. The excretion of gaseous matters from the alimentary canal is considered in the article Flatulence.

24. *b.* The *urinary excretion* varies in quantity, influenced by the interruption or abundance — 1st, of the respiratory exhalation; 2d, of the cutaneous transpiration; 3d, of the intestinal exhalations: copious discharges from one or more of these surfaces diminishing this excretion, and opposite states increasing it. The urine may also contain various foreign matters, or certain of its usual constituents in excess; but generally as a consequence of disease. It contains much gelatine and urea, in *typhoid* or *adynamic fevers*; much albumen and phosphate of lime, in rickets; much urea or lithic acid, in *dyspeptic affections* and gout; and much saccharine matter, in diabetes. In *inflammatory fevers*, the urine is red, deep-coloured, or even a deep brown, and transparent, until a crisis occurs; when it becomes more copious, and deposits the lateritious sediment, which is of a reddish colour, and consists of phosphate of lime, lithic acid, sometimes lithate of ammonia, and animal matter, with lithate of soda, and purpurates of ammonia and soda, according to Dr. Prout. In *intermittents*, it varies with the stage of the paroxysm; but, after the seizure, it deposits a red powder, consisting of rosacic acid. In *gout* and *rheumatism*, it contains much lithic acid. In *hysteria*, it is copious, of a pale colour, is deficient in urea and animal matter, and abounds with the usual salts. In *jaundice*, and other diseases interrupting the functions of the liver, the urine presents a brown or muddy appearance, or contains bile; the kidneys having to a certain extent assumed an office vicarious of that of the liver. In

bilious remittent fevers, it often possesses a similar character. In *dropsies*, it is sometimes yellowish green and extremely viscid. It generally deposits a copious sediment of rosacic acid, lithic acid, phosphate of lime, and animal matter; and in acute dropsy is frequently so loaded with albumen as to coagulate when heated, or when sulphuric or nitric acid is added to it.

25. In all *inflammatory diseases*, the urine is small in quantity and high-coloured, and contains acids in excess; but in *disorders of irritation* or *debility*, it is generally pale, in large quantity, and abounds in neutral saline, or alkaline substances. *Blood* is sometimes found in the urine; and the inky or black colour it presents on rare occasions, most probably is caused by the passage of the colouring matter of the blood along with it from the kidneys, and by the action of the salts contained in it. Dr. Marcet ascribed this colour to a particular acid, which he called the melanic. In a few cases, the urine assumes an almost gelatinous state shortly after it is voided. I met with an instance of this kind in an advanced stage of pregnancy; severe pains in the loins and sickness being complained of. Antiphlogistic treatment removed it. *Mucus* and *puriform* matters are also seen in the urine, during and after irritation, or inflammatory diseases, of the kidneys, bladder, or prostate gland. (See Kidneys, and Urine.)

26. *c. Vicarious excretion* is of frequent occurrence in several diseases; and takes place to a certain extent even in health; causes which merely diminish excretion in one part, increasing it in others, without manifest disorder ensuing. But no excretion can ever be long, or much interrupted, without disease supervening; the increased function, which supplies its place for a while, itself sooner or later passing into disorder of a more or less acute kind and dangerous character. The perspiratory and respiratory exhalations are seldom altogether suppressed; but when they are interrupted, one or two things generally ensue: — 1st. When the vital powers are not materially depressed, nor any organ disposed to disease, the actions of the kidneys, of the liver, and bowels, are individually or conjointly increased, so as to compensate for the interruption of either of these exhalations; — 2d. If such compensation does not take place, or if some organ is disposed to disorder, the vascular system is overloaded by the consequent augmentation of the serous parts of the blood, or irritated by the retention of matters requiring to be excreted; and the predisposed organ becomes congested or inflamed; fevers, inflammations, &c. supervening, according to individual predisposition and concurrent causes.

27. *d. Interruption or suppression of the urinary function* is one of the most serious occurrences to which the frame is liable, and the least admits of being replaced even for a time by other excretions. Yet a compensation sometimes takes place to an extent preservative of life, for several days, or until suppression is removed. In such cases, the exhalations from the lungs, the cutaneous transpiration, and the actions of the alimentary canal, are individually or conjointly increased, so as to supply the deficiency; and the urinous or ammoniacal fœtor of the breath and perspiration often indicates that the excretion of urea and other injurious matters is effected chiefly by the cutaneous and pulmonary surfaces. In some instances, a urinous fluid, or rather fluid containing urea and the salts usually found in the urine, is exhaled in considerable quantity during the repeated or prolonged vomiting that often attends disease of the kidneys with suppression of urine; and, in other instances, the intestinal discharges become watery, urinous, and abundant. When the suppression is complete, much more serious results follow: a *urinous species of fever* supervenes, owing to the retention in the blood of an excess of serum holding alkaline and highly azotised salts in solution, and to the actions of other excreting organs being insufficient to compensate for the suppression. In such instances, the pulse is accelerated, large, full, and oppressed; the perspiration copious and offensive; the soft solids and muscles flaccid; the bowels irregular or relaxed, and the stools morbid and fœtid; the countenance and cutaneous surface foul or lurid; and the fœtor of the patient's apartment often remarkable. These cases generally terminate in coma, or sudden death, with or without convulsions, owing to the influence of the impure blood on the brain; and in effusion into serous cavities: but similar terminations of interrupted urinary excretion sometimes take place without antecedent urinous fever. In a very hopeless case of this form of fever, in the cook of a friend's family, the secretion of urine, which had been suppressed entirely for several days, was restored by cupping repeatedly on the loins, and by diuretics, purgatives, and deobstruents. The abundance and fœtor of the exhalations from the lungs and skin were very great in this case.

28. *e. Interruption of the biliary excretion* may continue for a long time without a fatal result; but whether the secretion be suppressed, or the discharge of it into the intestines prevented, serious consequences usually ensue, although the bile may not pass or be absorbed into the circulation. If the secretion does not proceed, the other excretions become morbid, particularly the fæcal and urinary; the breath and perspiration are offensive; the skin sallow or lurid; digestion and assimilation are interrupted; and, in the process of eliminating those matters from the blood, by which the organs are irritated, additional disease is excited, and complications induced. Thus the alimentary canal, lungs, kidneys, as well as the liver, often become affected. Even when bile is secreted, its discharge being prevented by obstruction of the ducts, the part of it which passes into the circulation is frequently so far removed by the kidneys and skin as to prevent, for a considerable time, any change in the blood sufficient to destroy life. (See Disease, § 162. 168.)

29. *f. Protracted or frequent interruption of the fæcal excretions* are generally in some degree compensated by an increase of the cutaneous and pulmonary exhalations and of the urine, and serious effects are thereby prevented for a time. These vicarious excretions are generally very offensive, owing to the quantity of effete animal matter carried off in the exhaled vapour; and they not infrequently excite dangerous disease of the organs by which they are principally effected. In a case of stricture of the transverse colon, at present under my care, with nearly complete

obstruction of fæcal excretion, pulmonary disease has been superinduced; the kidneys having become the chief excreting organs, and their actions greatly increased. Of the other vicarious excretions, it is unnecessary to add any thing to what is stated in the articles Disease (§ 162. *et seq.*), Hæmorrhage, Menstruation, and Symptomatology; topics which have not been alluded to at this place, being considered in those articles to which they more especially belong, and where their practical importance is fully estimated.

30. *g.* The *practical indications furnished by the excretions* in their increase, diminution, and alteration, as well as in their reciprocative relations, are most important in the management of disease. It is shown in various places, that one of the earliest effects of the exciting causes of disorder is the interruption or suppression of one or more of the excreting actions; it therefore follows, that the restoration of the interrupted function should be a principal indication of cure. The diversified and ever-varying states of the several excretions ought, in addition to the estimation of quantity, to be made subjects of attentive and daily examination; as furnishing, when interpreted aright, the surest proofs of existing disorder, and of the operation of medicines, as well as the firmest basis of rational or philosophical practice. The effects of impeded excretion on the blood and on the nervous system should be carefully watched and considered; and such as most obviously result, although often unaccountably overlooked both by writers and by practitioners — especially vascular fulness, local or general, with more or less of deterioration of the circulating fluids — ought to be prevented or removed by means appropriate to the peculiarities of the disease, and of the circumstances in which it is observed. (See Physic — *Practical Principles of.*)

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EXPECTORATION (from *Ex* and *pectus*).

—Classif. Pathology — *Symptomatology.*

1. This word, which signifies *the act of discharging any substance from the chest*, is now usually applied to *the matters so discharged*. The secretion which moistens the surface of the bronchi is a colourless and somewhat viscid fluid, consisting chiefly of the serum of the blood, and a modified, peculiar, or slightly glutinous form of albumen. It is so scanty in health, as to be seldom or very rarely excreted: but in disease, its *quantity* varies very much; it being commonly — occasionally, remarkably — increased, excepting at the onset of some inflammatory or exanthematous complaints, when it is diminished, and then only for a short time. Its *quality* or appearance is also extremely different, in different maladies, and even in different stages of the same malady, seated in or implicating the respiratory or circulating organs; particularly as regards the quantity and condition of the animal matter or *albumen* which it contains. The saline substances found in the serum of the blood also exist in it, but in various proportions; they being usually more abundant in hæmorrhagic and inflammatory diseases of these organs.

2. *A.* The *appearance* and *quantity* of the expectorated matter are amongst the surest rational signs of the progress and state of several diseases of the chest, especially bronchitis and pneumonia; and in many instances they alone furnish sufficient grounds of both *diagnosis* and *prognosis*. They should, therefore, whenever the functions of respiration are disturbed, or when the bronchial secretion is any way altered, be carefully inspected. For this purpose the sputum ought to be collected in two glass vessels; one of which should be previously nearly filled with clear water, in order that it may be examined both alone and on the surface of water. The periods of expectoration should also be noted, with the frequency and nature of the cough, and the degree of difficulty attending the excretion.

3. *a.* The *colour* of the sputum varies, in pulmonary diseases, from the colourless and transparent or diaphanous, and viscid or glairy fluid of the early stages of bronchitis, through every possible shade, to the blackest hue exhibited in melanosis or in gangrene of the lungs. The expectoration is partly yellowish and opaque, and partly mucous, pituitous, and serous, variously mixed, in chronic bronchitis; and it is yellowish, greenish, greenish yellow, slightly mixed with blood, red or rusty, in pneumonia. Its colour is ash-grey in phthisis, and blackish in the rare states of disease just mentioned. But healthy persons often expectorate mucus so intimately mixed with the carbonaceous particles usually floating in the air of large towns and factories, as to resemble the sputum in melanosis of the lungs.

4. *b.* The *savour* of the expectoration is by no means constant in the same disease. It is sometimes sweetish or saltish, or intermediate, in phthisis and hæmoptysis. The *odour* of the sputum is sometimes disagreeable in chronic bronchitis, and in the ulcerated stages of phthisis; in which latter it is often fœtid; but it is much more so in gangrene of the lungs and pleura, and in the last stage of abscess of the lungs. Increased *warmth* of the sputum is not readily perceived, although it may exist in inflammatory affections of the lungs. Diminished warmth indicates dangerous or fatal sinking of the vital powers.

5. *c.* The *form* of the sputum is important; and is chiefly owing to the manner in which the morbid secretion is excreted; and to the quantity and modification of the albumen existing in it. When it is frothy, it may be inferred to have been expectorated with difficulty, and with severe cough: it then is generally fluid, glairy, transparent, con-

tains albumen, and runs into one mass in the containing vessel, to the sides of which it adheres slightly; as in catarrh, the early stages of bronchitis, &c. When it is viscid, opaque, somewhat frothy, and thick, it is usually brought up with much cough, contains much more albumen, adheres closely to that previously expectorated and to the sides of the vessel, and results from acute inflammation of the smaller bronchi and substance of the lungs. When it is rounded and isolated, it is expectorated more easily, as in advanced stages of pneumonia; and when it is thick, opaque, rounded, distinct, and muco-puriform, or purulent, it is also brought up with more ease, and proceeds from organic change of the substance of the lungs, as in certain states of phthisis, &c.

6. *d.* The *consistence* of the sputum is of much importance. When it is watery and serous, it generally proceeds from simple increase of the exhalation from the air-passages, without inflammation of, or merely with simple determination to, the bronchial surface; but this kind of expectoration may accompany phthisis, chronic pleurisy, and other thoracic diseases not seated in the bronchi. A mucous and transparent fluid is expectorated in catarrh, and in slight affections of the throat, but it also frequently attends the diseases of the chest just mentioned. Viscid, thick, and adhesive sputa, containing much albumen, characterise acute inflammation of the lungs. A membranous or tubular substance, with thin, viscid, or puriform mucus, is often discharged in croup, and consists chiefly of albumen, sometimes approaching the fibrinous state. In rare instances of sub-acute bronchitis, albuminous concretions, solid or tubular, and of an arborescent form, moulded in the ramifications of the bronchi (*Bronchial polypi*), are expectorated during the decline of the disease. Cases of this description are recorded by Tulpius, Dalbis, Consbruch, Bussures, Samber, De Haen, Warren, Callisen, Strack, Dixon, Acharius, Cheyne, and Iliff.

7. The *quantity* of expectorated matters varies extremely At the commencement of inflammations it is but little increased; but is augmented with the progress of disease, and diminished as disorder subsides. Suppression of the expectoration, especially when sudden, the pulse continuing frequent and the other symptoms unameliorated or exasperated, is a very dangerous circumstance. The more watery or thin the consistence, the more copious is the expectoration, as in bronchitis and bronchorrhœa; and the more thick, opaque, or dense it is, and the smaller the quantity compared with the severity of the other symptoms, the more seriously is the substance of the lungs diseased, as in pneumonia and phthisis. In many cases of the worst states of these diseases, the sputum is very scanty to the close.

8. *Bloody expectoration* is a serious appearance; but it is of importance to ascertain its origin, and to consider it in connection with all the phenomena. An exudation of blood from the nasal fossæ, from the posterior fauces or pharynx, or even from the gums, may take place, either so as merely to tinge the surface of the sputa, or to the extent of constituting a dangerous hæmorrhage. In these cases, the blood is not frothy, and is not mixed with the matters brought up from the air-passages. If the expectoration be thin, frothy, ropy, and only streaked with blood, the fits of coughing are generally the cause of the bloody appearance. If the blood be mixed in a ropy, opaque, or puriform mucus, very acute bronchial inflammation is usually present; and if it be seen in spots in thick, opaque sputa, acute inflammation of the smaller ramifications of the bronchi, often extending to the substance of the lungs, may be inferred. When the blood expectorated is very abundant, or nearly pure (*hæmoptysis*), it may proceed from simple exudation from the bronchial surface, or from organic changes of the lungs, heart, or large vessels. (See Hæmorrhage and Lungs.)

9. When the blood is simply exhaled from the air-cells of the *lungs*, it is florid and frothy, and more or less abundant. If the sputa be only tinged with blood, or reddish, and thick, viscid, adhesive, or slightly frothy, pneumonia is certainly present. If the expectoration become ochry, rusty, reddish brown, livid, and rounded, purulent infiltration, hepatisation in an advanced stage, or some other most dangerous organic change of the lungs, exists. Bloody sputa, but of no constant form, also attend the effusion of blood in the parenchyma of the lungs, and phthisis. The appearance of blood in the sputa, late in pulmonary diseases, or in very minute quantity, is of much more serious import, than in an early stage, or in large quantity.

10. *C. Purulent expectoration*, of a pure and unmixed kind, is much less frequent than is commonly supposed; what is usually considered purulent, being a mixture of puriform matter with mucus, and a product of inflammatory irritation in the bronchi. As a symptom of phthisis it deserves little attention, as this disease may be present, and even run its entire course, without its appearance: and it may be most remarkable, particularly in very young subjects, in the slighter pulmonary affections, as in chronic bronchitis, in the decline of severe catarrh, and in hooping-cough; in which latter, the morbid secretion in great part proceeds from the posterior fauces, pharynx, and their vicinity. When observed in phthisis, it is owing commonly to associated chronic bronchitis, or to the communication of a tubercular excavation with the bronchi, the puriform matter being secreted by the irritated surface of these tubes. But pus is seldom or never seen in a pure state, and unmixed with mucus, unless when a large vomica, or abscess, either formed in the parenchyma of the lungs, or extending thither from the liver, bursts into the bronchi. In this case, the matter, variously tinged, is friable, often fœtid, does not retain air-bubbles, and sinks or diffuses itself in water. When mixed with mucus, as in other pulmonary diseases, it does not present these characters, excepting in a very partial and variously modified form, as shown in the articles Bronchi, and Lungs. When an abscess forms in the lungs, which is a comparatively rare occurrence, and bursts into the bronchi, the pus expectorated is generally in very large quantity; the expectoration continuing until the abscess is partially emptied; when it frequently altogether ceases, and again returns in great abundance when the cavity is refilled; the intervals often extending to several days. In these cases, the

matter is yellow, whitish yellow, yellowish green, or reddish yellow; presents all the characters of pure pus, excepting in the intervals when the more scanty sputa is generally mixed with mucus; and ultimately becomes more offensive, and assumes deeper shades of colour. I lately attended a case where abscess formed in the substance of the right lung presented these well-defined characters; yet the patient never coughed during its formation — although it was so large as to bulge out the right side of the thorax — nor until the time of its bursting into the bronchi.

11. *D.* The appearance of fine, white streaks; or the presence of *whitish*, or *whitish yellow, small masses*, like boiled rice, in a mucous or muco-puriform sputa, generally indicates the softening of tubercles: but the earlier and more advanced stages of phthisis are attended by the very varying state of the expectoration described in the article on that malady. *Sabulous, calculous*, or *earthy matters* are sometimes expectorated in certain states of pulmonary or phthisical disease; but these matters do not indicate the most dangerous forms; for I have known several cases where recovery took place after their discharge. The presence of *hydatids* in the expectoration is very rare. — Substances that are swallowed, are sometimes coughed up from the trachea, through an ulcerated communication formed between it and the œsophagus. ZEVIANI records a case of this kind; and one was, a few years since, attended by Mr. BYAM and myself. The various modifications of the expectoration, during the progress of pulmonary diseases, are minutely described in the articles BRONCHI, HÆMORRHAGE, LUNGS, and TUBERCULAR CONSUMPTION; and the indications derived from this source are there duly pointed out.

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EYE, DISEASES OF THE. — SYN. Ὀφθαλμὸς. *Oculus. Das Auge*, Germ. *Œil*, Fr. *Occhio*, Ital.

CLASSIF. SPECIAL PATHOLOGY — MORBID STRUCTURES.

1. The progress of knowledge, in respect of diseases of the eye, has been very remarkable since the end of the last century; owing chiefly to the researches and writings of BEER, SCHMIDT, HIMLY, SCARPA, BENEDICT, DEMOURS, EDMONDSTON, VETCH, WARDROP, WELLER, TRAVERS, GUTHRIE, MACKENZIE, and LAWRENCE. In the account that will be here given of these diseases, those only which are inflammatory, and consequent upon inflammation, will be considered. Functional disorders are treated of in separate articles. (See AMAUROSIS, SIGHT, &c.) The order in which these maladies will be discussed, will differ but little from that adopted in the truly valuable works of Mr. LAWRENCE and Mr. MACKENZIE; to which I have much pleasure in stating my obligations. — The latter of these writers, and J. FRANK, treat first of the diseases of the eyelids and lachrymal apparatus, and next of the eye itself. Mr. LAWRENCE enters at once upon the consideration of the inflammatory diseases of the tissues of the eye-ball, and concludes his classical production with those of the appendages. Either arrangement is unexceptionable; but I shall follow the latter, merely as being more congruous with the medical view of the subject, to which I shall chiefly confine myself. The surgical treatment of such of those diseases as require it, must be studied in the works now referred to, or in Mr. COOPER's *Surgical Dictionary*. I shall, therefore, *first* treat of inflammations affecting the external coats of the eye, and *afterwards* of those attacking the internal tissues of the organ.

I. INFLAMMATIONS OF THE EYE. — SYN. *Ophthalmia; Lippitudo*, Celsus; *Augenentzündung*, Germ.; *Ophthalmie*, Fr.; *Ottalmia*, Ital.

CLASSIF. — 1. *Class*, 2. *Order* (*Cullen*). 3. *Class*, 2. *Order* (*Good*). III. CLASS, I. ORDER (*Author*).

2. DEFIN. — *Pain in one or both eyes, with vascular injection of one or more of their constituent tissues, and constitutional disorder.*

3. Inflammations of the eye are of various grades and kinds: they commence in any one of the different tissues forming the organ; and they are thus limited more or less, and for a longer or shorter period of their course, according to the temperament, habit of body, and diathesis of the patient; to the state of predisposition, and the nature of the exciting causes; and to the treatment adopted. Before considering separately the different varieties of ophthalmia, I shall *first* take a general view of their *causes*; and *next* of the numerous *forms* they present, owing to the varied concurrence of predisposing and exciting causes.

4. i. CAUSES. — *A.* The *predisposing causes* of inflammation of the eye are nearly the same as those of inflammatory diseases of other organs. — (*a*) *Temperament, idiosyncrasy*, and consequently *hereditary disposition*, evidently favour its occurrence. The colour of the eye has apparently but little influence, for Dr. SMITH found the relative proportion of cases in light eyes nearly the same as in dark eyes. — (*b*) *Morbid diathesis*, especially the *scrofulous*, has the most remarkable effect, and next the *gouty* and *rheumatic*. These not only dispose to, but also modify, the disease and its consequences, and require for it appropriate modes of treatment. — (*c*) It is difficult to determine how far *age* and *sex* have any influence; but advanced age certainly favours the supervention of chronic inflammation of this organ. — (*d*) *Climate* has a much more manifest effect. The excessive cold, and reflected light, in hyperborean regions; and the great warmth, dryness, and reflected heat of some countries, especially Egypt, Arabia, &c., heightened by the quantity of fine dust floating in the atmosphere; not only predispose to, but excite, ophthalmia. — (*e*) Great *exertion of the eyes* occasions disease of

them; but chiefly when aided by too full living, by the use of stimulating liquors, and by an improper management of light, in respect both of the object on which the sight is exerted, and of the eye itself. — (*f*) Various *occupations*, consequently, are very liable to ophthalmia; as engraving, watchmaking, wool-sorting, and the manufacture of minute objects. — (*g*) The *suppression of accustomed discharges*, as of the catamenia and hæmorrhoids, and an impeded return of blood from the head, favour the supervention of inflammation of this organ, by occasioning cerebral congestion.— (*h*) A *plethoric habit*, and particularly *fulness of blood in the head*, are very common predisposing causes; and often exist in connection with the preceding.—(*i*) *Impaired constitutional power* is most influential, especially during convalescence from exanthematous diseases. — (*k*) An unhealthy or *cachectic state*, owing to impaired digestive, assimilative, and excreting functions, has also a most marked effect, and is often further associated with local or general plethora; particularly in those addicted to spirituous or fermented liquors, or who lead a sedentary and indolent life, or live in close, smoky, crowded, and unhealthy situations, or are subjected to anxiety of mind and other depressing passions. — (*l*) *Too full or rich living, errors in diet*, and the inordinate indulgence of the appetites, frequently predispose to ophthalmia by inducing plethora, and consecutively hepatic and cerebral congestions, imperfect secretion and excretion, torpor of the biliary and intestinal functions, and ultimately a morbid state of the circulating fluids and disordered vascular action. — (*m*) *Inordinate indulgence of the sexual propensities* has often a powerful influence, especially in connection with any of the preceding causes; the eyes sympathising remarkably with the generative organs.

5. *B*. The *exciting causes* of ophthalmia are numerous and diversified. Injuries inflicted on the eye, its appendages, or parts adjoining; wounds of a filament of the ophthalmic branches of the fifth pair of nerves; carious teeth; the presence of dust, or minute foreign bodies, between the surface of the globe and the eyelids; the irritation produced by acrid, stimulating, or chemical bodies, whether in the form of powder, fumes, or vapours; stimulating, acrid, or caustic applications to the organ; operations on the eye, or on adjoining parts; the introduction of contagious secretions, as the gonorrhœal discharge, or the matter of purulent ophthalmia; excessive exertion of the eyes, especially with artificial light, at late hours, or with the head held low, and on bright or minute objects; an impure, smoky, or fuliginous atmosphere, particularly in manufacturing towns, crowded and close streets, confined dwellings, poor-houses, hospitals, and the low cabins of the peasantry; the fogs of large cities, which prevent the smoke and vapours from rising in the atmosphere, and from being otherwise dissipated; exposure of the eyes to cold, or to currents of air; riding in an open carriage, or in a close carriage with the face to the horses and the carriage windows open; and too full living, or the abuse of intoxicating liquors; are the most common causes of ophthalmic inflammations. The eyes, moreover, participate with other parts, frequently in a very remarkable degree, in the inflammatory state characterising the exanthemata; and hence certain specific forms of ophthalmia hereafter to be noticed.

6. The modes in which these causes act are sufficiently obvious: but there are one or two that require a more particular notice. *Exposure to light* is injurious — 1st, by its sudden or powerful impression; 2dly, by its combination with heat, as in glass-houses, founderies, forges, &c.; and, 3dly, by being reflected or refracted. Owing to this last circumstance, certain colours, especially red and orange, or the simultaneous impression of a variety of colours, or their rapid succession, irritate the eyes in a very remarkable manner. The reflected light from snow has also a very great effect; and from which the Tartars protect themselves by wearing spectacles of closely netted black horsehair; and the Esquimaux by an excavated piece of light wood, with a narrow slit corresponding with the fissure between the eyelids, and blackened on the inner or concave surface. Reflected light attended by high temperature is equally injurious. The glare from the white chalky roads in some parts during summer, and from the white houses and sandy surfaces of some warm countries, is a very frequent cause of ophthalmia. Another and a hitherto unrecognised cause, particularly of inflammation of the internal tunics, is reading, writing, or otherwise exerting the eyes, by the light refracted by ground glass shades placed around the flame of lamps used for illuminating rooms. About fifteen years ago, I was affected with slight inflammation of the internal tunics of the eye; but having fully ascertained its cause to have been the use of a table-lamp of this description, it soon subsided upon adopting suitable treatment and a different kind of light. I have since had no return of the disease, although I have continued for many years to read or write from eight o'clock in the evening till two or three in the morning.* The intimate vascular and nervous connection of the eye with the brain causes it to participate in several of the inflammatory states of the latter. Hence those causes which excite increased vascular action, or congestions, in the brain or its membranes, both predispose to and excite similar affections of the eye, especially of its internal tunics. In a perfectly healthy state of the system, a single exciting cause seldom occasions the disease, unless its operation be long continued, or very intense. It is the co-operation of two or more causes, or the action of several in quick succession, that is most injurious. But when the system is rendered susceptible of their impression, by the prolonged or continued influence of the predisposing agents, either of the more immediate causes, although acting singly, will frequently take effect.

7. ii. THE VARIETIES AND FORMS which inflammation of the eye presents, are very diversified. The severity or *acuteness* of the symptoms,

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* I write, and generally read, at a desk placed sufficiently high to prevent the head from being held low; and use two lamps with single wicks, the flames of which are equal to two large wax candles, and which are raised so high that the eyebrows and eyelids completely shade the eyeballs from the light. These are fed with the finest sperm oil; and, the flame being duly adjusted, they burn eight hours, without any diminution of their light, and without requiring to be once touched. The chief advantages of this light are its softness and clearness, the permanent height at which it remains, and the entire absence of the smallest trouble.

and the *rapidity* of the progress, of ophthalmia, vary from the slightest increase of vascular injection and action, and the most prolonged continuance, up to the most violent and rapid states in which inflammatory action is ever manifested. Hence the conventional terms of *acute, chronic*, and *sub-acute* or intermediate, are to be viewed with due latitude as to their import. But ophthalmia, like other inflammations, may be modified in *kind or form*, as well as in *grade* and *duration*, owing to peculiarity of constitution, morbid diathesis, the manifestations of vital power, and the state of the circulating fluids. Thus, ophthalmia in the scrofulous, gouty, or rheumatic diathesis, is different from that affecting sound constitutions; and that occurring in the course of, or subsequent to, the exanthemata, or during typhus fever, or after the passage of purulent matter into the circulation, is individually different from either of the foregoing, although the grade of action and of vascular injection may be apparently the same in all. I cannot, therefore, agree with Mr. LAWRENCE, when he infers that no such distinctions as sthenic and asthenic actually exist (*Treatise, &c.* p. 66.). This conclusion is the result of considering inflammation merely as increased vascular action, and without reference to the state of local and general vital power. But the phenomena, the progress, and the results of inflammation, in the various forms and circumstances in which it occurs, as well as the effects of treatment, show, that excited vascular action does not imply increased power; and that the former often exists, not only without the latter, but even with a diminution of it, as fully shown in the articles DISEASE, ERYSIPELAS, FEVER, and INFLAMMATION.

8. Ophthalmia differs in degree, at different periods of its course. Thus, it may be slight and prolonged, and suddenly become most violent, acute, and rapid; or, from the latter, it may lapse into an indolent, slow, or chronic form; owing to various contingent causes, to constitution, and to the treatment adopted. It is also remarkably modified by the tissue in which it is seated; by the nature of the predisposing and exciting causes; by its supervention upon, or complication with, other morbid states, or specific forms of disease; and by the age, habit of body, and regimen of the patient. Out of these circumstances arise the numerous varieties distinctly established by modern writers, and recognised by every observing practitioner, and the arrangements of them adopted in recent systematic works. The importance of divisions of this subject is shown by the different consequences or terminations usually observed to belong to each of the varieties, and by the modified treatment they individually require. Without carrying the subdivision as far as J. FRANK, or too far for practical purposes, I shall *first* consider inflammation of the *external tissues* of the eye ball, *next* those seated in the *internal tissues*, and *lastly* the much more rare occurrence of inflammation of the *whole eye*. In treating of inflammation of each of the tissues, its *common form* will be first described and afterwards those *specific* or modified kinds, it occasionally assumes from peculiarity of cause or of diathesis.

II. INFLAMMATION OF THE EXTERNAL TISSUES OF THE EYE.—i. OF THE CONJUNCTIVA.—SYN. *Conjunctivitis*, MACKENZIE; *Ophthalmia*, of numerous writers.

9. CHARACT. — *Redness, from increased vascularity of the external coat of the eye, with pain, tumefaction, and febrile disturbance of the system; the enlarged vessels shifting their place with the motions of the eyeball or eyelids.*

10. The muco-cutaneous membrane that covers the insides of the eyelids, and anterior third of the eyeball, may be inflamed in particular parts, or throughout its extent, in every grade of severity, and for various periods of duration. When this membrane is inflamed, the vessels are comparatively large, tortuous, and of a scarlet colour. They anastomose very freely, or form a network over the white of the eye, and are drawn aside by dragging the eyelids, or moved by rolling the eyeball; whereas, when the sclerotica is inflamed, the vessels are small, straight, of a pink hue, and unsusceptible of motion, either by dragging the eyelids or rolling the globe. When, however, the inflammation is so severe that chemosis exists, or the conjunctiva becomes tumid, and the discharge copious and muco-purulent, this distinction cannot be made, nor, indeed, does it altogether exist, as the inflammatory action from contiguity extends more or less to the sclerotica, and even to the iris and the cornea.

A. MILD INFLAMMATION OF THE CONJUNCTIVA. — SYN. *Catarrhal Ophthalmia*, LAWRENCE; *Conjunctivitis puro-mucosa atmospherica*, MACKENZIE; *Conjunctivitis catarrhalis*.

11. *a.* I have adopted the appellation employed by Dr. JACOB as the most appropriate; for, although the disease is generally *caused* by exposure to cold, yet it sometimes also arises otherwise. It is most common in spring and autumn; is sometimes epidemic; affects young persons oftener than adults; and frequently attacks most of the members of a family, or, when it appears in a school, a large number of children. Exposure to currents of cold air, or to the night air; north-east or easterly winds, and other atmospheric influences; damp feet; intoxication; fogs, smoky apartments, irritating vapours; and disorders of the digestive organs; most commonly occasion it. A person who has once experienced an attack, is very liable to a return of it; and I believe, with Mr. MACKENZIE, that, in the most severe cases, when the discharge is puriform, it may be propagated by contagion; the disease then passing into the purulent and severe form.

12. *b. Symptoms.* — This form of ophthalmia seldom extends deeper than the conjunctiva. It may be confined chiefly to the lids (*Blepharo-conjunctivitis catarrhalis*); and may affect also the globe (*Ophthalmo-conjunctivitis catarrhalis*). It commonly commences in the eyelids, or circumference of the globe, and extends gradually to the cornea, with a sense of stiffness, smarting, dryness, and as if dust had got into the eye. The intolerance of light and pain are slight; and the secretion at first is diminished, but it is soon succeeded by watering and increased redness. When more fully developed, the redness is superficial, somewhat irregular, of a bright scarlet; and the enlarged vessels are superficial, and are readily pushed aside by pulling the eyelids. In the most severe and acute cases, the membranes become generally and uniformly red; sometimes with spots of ecchymosis, or with minute vesicles or

pustules near the margin of the cornea. There is very little swelling, and rarely any chemosis. An increased *mucous* discharge, which is at first thin and colourless, but afterwards yellowish or whitish, proceeds from the inflamed surface; but it is seldom in considerable quantity, unless in the most severe cases, when it is copious and muco-puriform. Inflammatory irritation frequently also affects the lining membrane of the frontal sinuses and antrum, occasioning pain and sense of weight in these parts. The patient complains of chills, of headach, exacerbations of fever, especially towards night, of impaired appetite, and of sickness or disorder of the stomach. The tongue is generally loaded, and the bowels constipated.

13. *c. Terminations and Prognosis.*—The symptoms continue for three or four days; or, under unfavourable circumstances, for a longer time; but they generally yield to treatment, and gradually subside; the secretion becoming more puriform and thick, but less copious, until the affection disappears. If the inflammation be very violent, or improperly treated, or if it occur in the scrofulous constitution, or in persons imperfectly nourished, or of dirty habits, considerable chemosis may ensue, and the sclerotica and cornea may also become inflamed; causing opacity, or even ulceration, of the latter; and giving rise to a copious puriform discharge, capable of propagating the disease, if introduced into the eye of a sound person. When catarrhal ophthalmia has been severe or of long duration, or has frequently recurred, the palpebral conjunctiva experiences change of structure, and becomes thickened, wlth elevations or granulations on its surface. The lower lid generally suffers most; the granulations being, according to Dr. Eble, more numerous in the folds of the membrane between the globe and lid, than on the lid itself. Catarrhal ophthalmia, also, particularly in children of scrofulous constitutions, is liable to degenerate into the pustular or phlyctenular form of strumous ophthalmia.

14. *d. Diagnosis.* — The very slight pain and intolerance of light, although the vascularity be great; the superficial and scarlet redness of the membrane; the diurnal remissions, and evening exacerbations; the motion of the superficial and enlarged vessels; and the natural state of the sclerotica; distinguish this variety from common *inflammation of the external proper coats*, or catarrhal-rheumatic ophthalmia. But the one affection may nearly approximate, or even run into, the other, in the most severe cases. The catarrhal origin, and usually mild character of this affection, and the mucous secretion, are the only circumstances which really distinguish it from *purulent ophthalmia;* the severer states of the former and the mildest of the latter being so nearly allied that they be justly viewed as merely grades of the same disease.

15. *e. Treatment.*— In the mildest states of the affection, smart purgatives, diaphoretics, and low diet are sufficient to produce a cure. If the tongue be loaded, an emetic is of service. In more severe cases, local depletion, followed by an emetic, purgatives, and diaphoretics, is necessary. Venæsection is required only in the most acute states, occurring in young or plethoric persons, and when both eyes are attacked. When the affection is connected with disorder of the digestive organs, it is readily removed by an emetic, by calomel and James's powder at night, by an active cathartic the following morning, and by sudorifics, aided by diluents, and warm poppy fomentations to the eye. When the inflammation is considerable, and not readily removed by these means, local depletions should be repeated, a blister applied to the nape of the neck, and purgatives, diaphoretics, and low diet persevered in. I agree with the German writers in considering warm applications to the eye preferable to cold, where the affection is produced by exposure to cold: but, when it is otherwise caused, and when the heat and smarting are considerable, cold washes are agreeable and generally beneficial. When the eyelids are gummed together in the night, a little spermaceti, or any other mild and fresh ointment, should be inserted between their edges in the evening.

16. Mr. Lawrence considers that this affection is one of those to which the application of strong astringents is most appropriate, especially if the inflammation do not extend beyond the mucous membrane; and those who more particularly recommend this treatment, believe that it may advantageously supersede general remedies, especially vascular depletion. Mr. Mackenzie states, that it was most advantageously employed by Beer in 1817. Mr. Melin directs a strong astringent, consisting of a solution of four grains of lunar caustic in an ounce of distilled water, to be dropped into the eyes twice a day, in the very commencement of the affection, with the view of arresting its progress. Mr. Bacot (*Treatise on Syphilis, &c.* p. 136.) states, that Dr. Ridgway originated this treatment, and that he prescribed ten grains of the lunar caustic to the ounce of water; he using this solution in gonorrhœal, as well as in catarrhal ophthalmia. Mr. Mackenzie, who appears to have had extensive experience of this practice, employs a solution of from two to four grains of this caustic in the ounce, and applies a large drop of it to the eye once a day; fomenting the organ thrice daily with a lukewarm collyrium consisting of one grain of corrosive sublimate and eight ounces of water. He introduces, at night, between the edges of the lids, a minute portion of an ointment containing a grain and a half of red precipitate to the drachm. Mr. Guthrie advises an ointment with ten grains of the nitrate of silver (§ 49.); and Dr. Jacob a few drops of a saturated solution of acetate of lead or of alum, to be introduced between the lids every night and morning.

17. A green shade may be worn before the eyes; but it is not necessary to confine the patient to the house, unless the weather be cold, windy, or rainy. Exposure to a mild atmosphere is advantageous (Lawrence).

18. *B.* Severe Inflammation of the Conjunctiva, or *Purulent Ophthalmia.* — Under this appellation I shall comprise those forms of conjunctivitis, whose symptoms are very violent, and whose progress is very acute; the discharge possessing the purulent character. Hence they have received the appellation of *blennorhœa*, and *suppurative* ophthalmia; the latter term, as Mr. Lawrence remarks, being objectionable. *Purulent ophthalmia* generally begins in the linings of

the lids. It soon extends to the conjunctiva of the globe; and, if not checked, to the cornea, which it either injures or altogether destroys. The conjunctiva is swollen and intensely red; the blood-vessels injected and enlarged; and the surface villous, pulpy, or granular. The discharge from the inflamed membrane is purulent and copious. When the disease extends to the cornea, interstitial deposition, causing opacity, and subsequently bursting, sloughing, and ulceration, if the malady proceeds, is a frequent result; prolapsus of the iris, escape of the humours, and collapse of the tunics, being ultimately produced. It is properly seated in the conjunctiva, and often goes through its course without extending deeper, unless the cornea become affected, or ulceration or sloughing takes place, as now stated.

19. *a.* Severe Inflammation of the Conjunctiva of Infants. — Syn. *Purulent Ophthalmia of Infants; Purulent Eye of Children,* Ware; *Ophthalmia Neonatorum,* Auct. var.; *Ophthalmia of new-born Children,* Mackenzie; *Blephar-Ophthalmitis glandulosa,* Beer. — The term used by Ware is inappropriate: and that employed by Beer implies that the disease originates in the Meibomian glands, and is incorrect; these glands being merely involved in the severe inflammation attacking the whole of the membrane.

20. *α. Causes.* — Purulent ophthalmia of new-born infants has been very generally imputed chiefly to leucorrhœal discharge in the mother. Schmidt, Mackenzie, and Lawrence maintain this opinion; and the last writer refers to cases in which the infant was affected with the disease, owing to the mother having had gonorrhœa at the time of parturition. But these are instances of gonorrhœal ophthalmia in new-born infants, which is a still more severe affection than that now being considered. I have strong reasons for concluding that the disease does not so frequently arise from leucorrhœa in the mother as is supposed; for, in many instances in which I have enquired into the causes, and in two or three where the intelligence of the mothers seemed decisive of the matter, no such disorder had ever been complained of. It should not be overlooked, as Dr. Jacob has, indeed, mentioned, that a mild form of conjunctivitis sometimes attacks very young infants from exposure to cold, — *mild catarrhal ophthalmia in new-born children.* Of this I have seen numerous instances. But the present violent state of disease depends, perhaps, as much upon the predisposition as upon the exciting causes; and there can be no doubt that infants are frequently born of mothers affected by leucorrhœa, or even by gonorrhœa, at the time of parturition, without being infected by purulent ophthalmia.

21. The *predisposing causes* are, delicacy and susceptibility of constitution, premature birth, and whatever depresses the system. The disease is most common in twins and weakly infants; in those newly born; in those subjected to bad or foul air, to cold, and to insufficient or inappropriate nourishment; in those deprived of the mother's care, and of the mother's breast; and in the children of the poor, and the dissolute. It is particularly prevalent and severe in Continental foundling hospitals, where the infant is without maternal care; but it is not very frequent in lying-in hospitals. Langenbeck (*Neue Chirurg. Biblioth.* b. iii. p. 208.) states, that in the Lying-in Hospital of Vienna, where the mothers are generally affected with leucorrhœa and gonorrhœa, but where the infants remain with them, the disease is not common; while in the foundling hospital, where the infants are half dead from cold and starvation when they are received, and deprived of their mothers, it is very prevalent. The *chief causes,* according to my enquiries, are those now stated, exposure to damp and cold air, improper nutriment, and especially the neglect of due ablution immediately after birth. In many of the cases that I have seen, the secretion covering the cutaneous surface in utero, which had not been removed from the eyelids and angles of the eyes, had evidently been the chief cause; and I am convinced that the presence of this matter, owing to the changes it undergoes when allowed to remain in contact with the external surfaces, especially near natural openings, after birth, is much more frequently a cause of purulent ophthalmia, than infection by leucorrhœa, although I do not deny the influence of this latter circumstance.

22. *β. Symptoms and Progress.* — This affection is of the utmost importance, as the majority of instances of blindness is caused by it. In a great proportion of cases it is far advanced before medical aid is required; it being frequently considered, at its commencement, as a common cold in the eye. It generally begins three or four days after birth; but it may occur at any subsequent period; the liability to it, owing to the nature of the exciting causes, being remarkably diminished when the child is some days, or a few weeks, old. In its *first stage* — the *Blepharo-blennorrhœa* of German writers — the inflammatton is chiefly confined to the lids; a circumstance further proving its origin in the cause now, for the first time, pointed out. The lids at first stick somewhat together when the child awakes; and their edges are red, particularly at the corners. External redness of them is sometimes, also, observed. The eye is usually closed, from pain occasioned by light. The globe is in a natural state; but the linings of the lids are red and villous, especially the lower, the insides of which are covered with a little white mucus. In the *second stage* — *Ophthalmo-blennorrhœa* of some writers — the inflammation is more severe, and extends to the conjunctiva of the globe. Redness and tumefaction are increased; the lids are swollen and red even externally; and the discharge becomes copious and purulent, agglutinates the edges of the palpebræ, accumulates beneath them, and bursts out between them, and pours over the face. The whole of the conjunctiva is now minutely injected, of a uniform bright scarlet colour, and tumefied; its surface is villous; and its loose folds between the lid and the globe become enlarged, form tumid rolls, and are finely granulated. These folds often evert the tarsi, causing ectropium, which generally subsides with the disappearance of the disease. When the swelling of the lids is great, the upper usually overhangs the lower, and is externally of a bright red. These appearances are aggravated by crying, when the globe is pushed forwards. The discharge is yellowish in various tints; and, in unhealthy or jaundiced children, it is often yellowish green. It is sometimes whitish; and it is

then less abundant and thicker. It is more rarely ichorous or sanious; but it is then thin and excoriating. An admixture of blood in the discharge is also rare.

23. Both eyes are usually affected; but the complaint commences generally a few days earlier in one than in the other. The attendant constitutional disturbance is very considerable; the tongue being white and loaded, and the bowels disordered. The infant is restless, feeble, and ultimately, especially if an unfavourable issue has taken place, pale, emaciated, and cachectic. When the disease extends to the conjunctiva of the globe, its *duration*, until either of its bad effects supervene, is various, but commonly from seven to fourteen days. It, however, is sometimes confined, for a considerable time, to the conjunctiva of the lids in a slight or chronic form, before the globe is affected.

24. *γ. Terminations.* — In the course of the disease, it is important that the practitioner should examine the eye so as not to increase the disorder. If the infant be asleep, the tarsus of the upper lid should be pushed very gently and lightly, upwards and backwards; but no further than to obtain a clear view of the cornea. If it be awake, the lids should be separated quickly, whilst it is quiet, and before the muscles can resist. An attempt to see the eye when it is crying is either ineffectual or injurious. — 1st. In the less severe cases, and in the more violent attacks, if early and judiciously treated, the tumefaction of the conjunctiva *subsides* gradually; the discharge is lessened, and becomes whitish; and the membrane gradually resumes its healthy state. — 2d. *Opacity* of the cornea may supervene, partially or generally; and, from interstitial infiltration of lymph, either into the tissue of the corneal conjunctiva, cause a superficial bluish film, or into the laminæ of the cornea, produce dense and total opacity. — 3d. *Adhesion* of the iris to the opaque cornea may occur, especially when the inflammation has extended throughout the latter, and passed to the iris. — 4th. Infiltration of pus between the lamellæ of the cornea, or *onyx*, causing *ulceration* of the external lamellæ, may take place. The ulceration may be of various extent and depth, — may affect nearly the whole surface of the cornea, or penetrate it, causing prolapse of the iris. This latter may adhere to the ulcerated part, and the ulceration either cease, or extend to the interior of the eye. — 5th. *Sloughing* of the cornea, which has been described by Saunders and Lawrence, but doubted by Mackenzie, may supervene, partially or generally. The part becomes dusky, loses its polish and vital cohesion, and assumes a dirty greyish or brownish appearance. A line of separation afterwards forms at the margin, and the dead part is thrown off. The whole cornea may perish thus, and the iris protrude through the aperture, presenting an irregular brownish or dirty prominence; and being either covered by the membrane of the aqueous humour, or nakedly exposed, the humours having escaped. Partial sloughing generally leaves a ragged ulcer, which often extends into the anterior chamber, causing prolapse of the iris. These terminations often quickly supervene and rapidly proceed, in young, feeble, and ill-nourished children, until the humours escape and the eye is destroyed.

25. When the *entire* cornea has either sloughed or ulcerated, and the humours have not escaped, the projecting iris recedes, and becomes covered by an opaque pellicle, the front of the eye being flattened. After *partial* ulceration or sloughing, the iris either adheres to the internal surface of the cornea, or prolapses through the opening; the projecting part gradually subsiding and disappearing, leaving a cicatrix in the cornea. In this case, the iris also adheres to the cornea, and there is change of figure, with contraction of the pupil; vision being either impaired or lost, according to the extent of the change. When *ulcers* of the cornea are spreading, they are of a dusky or yellowish white, irregular in their surface, and often with a ragged edge; but when they begin to heal, they have a greyish or bluish aspect; become smooth, soft, and gelatinous, from deposition of the matter which is to repair the breach; and red vessels pass from the conjunctiva, through the intervening transparent portion of the cornea. They thus heal, leaving a permanent opaque cicatrix (Lawrence).

26. *δ. Prognosis.* — Although remarkably violent, this affection readily yields, if treated early, and before the cornea has sustained any injury. The appearance of the discharge often indicates the state of the disease. The whiter and smaller in quantity, the lower is the grade of inflammation. The yellower and more copious the discharge, the more acute the disorder. An admixture of blood in it, indicates a violent state of action; but is not, in itself, dangerous. A thin, ichorous, or sanious discharge, marks the existence of sloughing or destructive ulceration. If there be superficial ulceration without onyx, probably only a slight speck may remain. If the ulceration be deep, permanent opacity will be the result. If the iris protrude, the pupil will be disfigured, and vision more or less impaired. If there be considerable onyx, the matter may be absorbed, or the purulent infiltration may increase, the cornea burst, and the eye become partially or totally staphylomatous.

27. *ε. Treatment.* — In the most acute cases, when the conjunctiva oculi is bright red and swollen, especially if the cornea looks hazy, or the palpebræ bright red and tumefied, depletion by leeches is requisite. A leech may be placed upon the temple, or, as Mr. Lawrence advises, upon the middle of the swollen upper lid; and it will generally procure a sufficient evacuation. If both eyes are affected, one may be applied to each temple or superior palpebra; but in weak infants, the two leeches should be small. If the state of the cornea be doubtful, and vascular action in the conjunctiva still acute, although the lids be not much swollen, nor very red, it will be better to apply the leech. Dr. Monteath (*Trans. of* Weller, &c. vol. i. p. 61.) advises scarification of the inner fleshy and granular surface of the lids, in preference to the application of leeches, the lids being kept everted until a sufficient quantity of blood has flowed, the replacement of them being always followed by arrest of the bleeding. Mr. Mackenzie directs the immediate application of astringents; but in the more violent cases, before the cornea has been materially injured, the depletion is beneficial. In the less severe attacks, and in feeble

or ill-nourished infants, the astringents about to be noticed may be at once employed. In every instance, purgatives ought to be prescribed. One grain of hydrargyrum cum creta, or of calomel, may be given, with three or four of magnesia or of rhubarb, at bedtime, and a dose of castor oil in the morning. A small blister may be applied on the posterior and middle part of the scalp, as advised by Dr. MONTEATH; but it should be removed in five or six hours, and the part carefully attended to. The eye should be bathed frequently with tepid milk and water, and a little fresh butter, or a mild form of the red precipitate ointment, applied between the edges of the lids at night, to prevent their agglutination, and favour the escape of the discharge.

28. Astringent collyria are more efficacious, and safer in this affection, than in any other, especially when resorted to at its commencement. But in severe cases, when the inflammation has proceeded so far as to endanger the cornea, it will be much safer to premise depletion, than to enter at once upon the use of astringents. Mr. WARE recommends a preparation formed by pouring eight ounces of boiling water on eight grains each of sulphate of copper and Armenian bole, and two of camphor. SCHMIDT prescribes a lotion of two grains of sulphate of zinc, three drops of liquor plumbi super-acetatis, twelve drops of spiritus vini camphoratus, and an ounce of distilled water. Mr. GUTHRIE directs the nitrate of silver ointment (§ 49.) to be applied with a brush over the inside of the lids. Mr. MACKENZIE employs a collyrium of one grain of corrosive sublimate and eight ounces of water, three or four times in the day; and, having washed off the discharge by this lotion, he applies, once, or at most twice, a day, to the conjunctiva, a solution of four grains of lunar caustic, or of six grains of sulphate of copper, in an ounce of water, by means of a camel-hair pencil; preventing the agglutination of the lids by smearing their edges at night with the mild red precipitate ointment (consisting of from twelve to twenty grains of the precipitate to the ounce). Dr. MONTEATH uses a nearly similar collyrium to that prescribed by this writer. Mr. LAWRENCE advises a solution of from two to ten grains of alum in an ounce of water, to be carefully injected between the lids three or four times in the twenty-four hours, so as to wash out the purulent secretion; and afterwards a soft rag, moistened in the solution, to be laid over the eye for a short time; the bowels being regulated by a mild aperient. If there be occasion to change the astringent, he prefers the lunar caustic solution, gradually increasing its strength from two grains to the ounce, to four or six, to be dropped between the lids twice or thrice a day.

29. When the cornea has ulcerated or sloughed, the infant is generally pale, weak, irritable, and restless; and tonics are required. The sulphate of quinine in the form of syrup, and the resinous extract of bark blended in milk, and given every three, four, or six hours, are the best preparations. The solution of the nitrate of silver, or of alum, may be applied to the eye. Opacity of the cornea is generally permanent; but instances of recovery have occurred. M. BILLARD mentions a case in which the recovery was spontaneous.

30. ζ. *Purulent Ophthalmia in Children.* —The treatment just recommended is most appropriate to newly-born infants, or to children of one, two, or three years old. In these latter, and in those somewhat older, the local depletion should be more active, according to their habit of body and strength; and *blisters* behind the ears are of much service. Blisters, unless employed with caution, and only so far as to produce slight redness, and followed by the application of warm poultices to the part, often are productive of much trouble in young infants; in older subjects, they are more beneficial. In the latter class of patients, vascular depletion, according to the circumstances of the case and of the patient, purgatives, blisters, and astringent applications, constitute the chief means of cure. Purulent ophthalmia introduced in large or crowded schools or foundling hospitals, may spread extensively and prevail long. Mr. MACGREGOR has described its prevalence for some years among the children of the Military Asylum at Chelsea. It was most severe in those having red hair, or of the scrofulous diathesis. It commenced in the eyelids with itching, sticking together of the lids on waking in the morning, followed, in twenty-four or thirty-six hours, by a viscid mucous secretion, extension of the inflammation of the conjunctiva oculi, redness of the skin around the eye, and a purulent discharge. General bleeding, leeching, purgatives, blisters behind the ears and on the nape of the neck, cold lotions, low diet, and, subsequently, astringent collyria, and the unguentum hydrarg. nitratis, at first mixed with twice its quantity of lard, but afterwards of its full strength, applied to the lids by means of a camel-hair pencil, were the remedies found most beneficial.

b. PURULENT OPHTHALMIA IN ADULTS.—SYN. *Oph. purulenta or puriformis, Suppurative Oph., Egyptian Oph., Ophthalmo and Blepharoblennorrhœa*, Auct. var.; *Oph. contagiosa; Oph. catarrhalis bellica; Blepharotis glandularis contagiosa*, BEER; *Adenitis palpebrarum contagiosa; Epidemic contagious Oph.*, ROSAS; *Conjunctivitis puro-mucosa contagiosa vel Egyptiaca*, MACKENZIE; *Purulent Oph. in the Adult*, LAWRENCE.

31. This affection is essentially the same as that just described, as to both nature and seat; it commences and extends in a similar manner, and produces the same ill effects, especially as respects the cornea and iris. Its severity, its serious consequences, its contagious properties, and its extensive prevalence at the commencement of this century, impart to it the highest interest. ASSALINI states, that two thirds of the French army in Egypt were affected with the complaint. Dr. VETCH treated 636 cases, including relapses, belonging to the second battalion of the 52d regiment, from August 1805, to August 1806; fifty having lost both eyes, and forty, one eye: and the ophthalmia depôt, under his able care, contained, in the summer of 1808, upwards of 900 cases. Mr. MACGREGOR mentions that, the returns of Chelsea and Kilmainham hospitals furnished 2317 cases; soldiers who had lost the sight of one eye not being included in the number: and that, from April to December, 1804, nearly 400 cases of this disease occurred in the Royal Military Asylum; and from that time to the end of 1820, upwards

of 900 cases additional, exclusive of relapses, had taken place in the same establishment. About this time it appeared in a large boys' school in Yorkshire; blindness, or serious injury to sight, having resulted in nearly twenty instances. Mueller treated 1604 cases, including 200 relapses, in the Prussian garrison of Mentz, during three years and a half: 1344 were restored to the service; fifteen became blind in both eyes; eighteen had vision impaired in both; and twenty-six were blind of one eye, — furnishing the most successful results upon record; but the complaint was more mild than in the British troops.

32. *a. Causes.* — The much discussed question as to the propagation of the disease by contagion [*] has been fully and ably considered by Edmondston, Vetch, Macgregor, Graeffe, Mueller, Omodei, Rust, Lawrence, and Mackenzie; and completely set at rest by the evidence they have adduced. My limits will permit only a brief view of the matter. It has been contended — 1st. That the complaint is produced by atmopheric and other causes, and that it is *not* contagious; — 2d. That, although it arises from these causes, it *is* contagious; — and, 3d. That it is a *specific* disease, communicable by contact of the purulent discharge, and not arising sporadically from other causes. — One of these opinions must be true; and, if true in all respects, the others must be false. In order to arrive at a correct conclusion, I shall *first* briefly review the facts adduced in support of the non-contagious nature of the complaint; *next*, notice those proving its contagious properties; and, *lastly*, show in what manner and under what circumstances it manifests these properties.

33. 1st. Those who contend that this disease is not contagious, argue that, in Egypt, the country in which it is endemic, and whence it was brought by the European armies invading it at the termination of the last and the commencement of the present century, it was not considered contagious; that this property was not noticed by any of the ancient visiters of that country, or by any who travelled thither before the period now mentioned; and that the army physicians and surgeons, who treated the malady there, did not suppose it to be contagious. Assalini, a physician who accompanied the French army into Egypt, denies this property, and refers it to the causes of ophthalmic diseases existing in that country; especially the powerful light and glare from the sandy surface, the dust floating in the air, the night chills and dews following the burning heat of day, and other atmospheric vicissitudes, to which the troops in very active service were necessarily subjected. Hence he, and other army physicians, viewed it as a very acute catarrhal inflammation, affecting those chiefly who were most exposed to these causes. Those who espouse this opinion, further appeal to the alleged fact, that there was no dissemination of it in the families, or districts, to which soldiers or other persons affected by it returned. But this argument is, in my opinion, more specious than correct; for instances were not numerous of soldiers having been dispersed in civil communities with the disease in its early and active stages; and where such occurrences did actually take place, many of the circumstances favouring contagion thereby ceased to exist. But, besides, the results were not altogether such as the non-contagionists have asserted, as exceptions now and then occurred to this broad and incautious statement. The fact noticed by Walther, that the complaint seemed to lose its contagious properties when single patients lived in their families, under the ordinary domestic relations, is admitted by him to be weakened by one exception; and is open to the objection just offered. The experiments of Mueller, who attempted to transmit the disease by applying the matter to the eyes of dogs, cats, and birds, without infecting them, is contradicted by others which succeeded. The experiment of Mr. Mackesey (*Edin. Med. and Surg. Journ.* vol. xii. p. 411.), who applied the discharge to his own eyes without communicating the malady, only shows that what is known and allowed of other contagious affections also obtains in this, viz. that the state of health, and of the organ of the exposed person, as well as the state of weather, frequently both dispose to, and prevent, the communication of a contagious disease; and that even inoculation will sometimes fail to convey it, owing to these and other circumstances.

34. 2d. Numerous facts have been adduced in proof of the contagious nature of the disease, to which only the most cavilling scepticism can object. Mr. Macgregor met with three instances of nurses, in the Military Asylum, having been infected by the accidental introduction of the matter into their eyes whilst injecting the eyes of patients; the affection manifesting itself within twelve hours afterwards in all the cases. Dr. Vetch applied the morbid secretion to the eye of a dog, in which it soon produced great irritation; but the animal was lost before the result could be ascertained fully. Rima, Va-

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[*] It may be supposed from the lines in Ovid,

> "Dum spectant læsos oculi, læduntur et ipsi,
> Multaque corporibus transitione nocent."

and the remark in Plutarch (L. v. Symp. 7.) as to "the readiness and certainty with which the contagion of ophthalmia spreads amongst persons living together," that the contagious nature of the disease was well known to the ancients. Galen (*De Differ. Febr.* i. c. 2.) enumerates it amongst infectious maladies; and Rabbi Moyses (*Aphor.* 24.) avers, that whoever attentively regards inflamed eyes, will contract the complaint. Benedictus Faventinus (*Prax.* v. i. sect. ii. c. 2.) gives it as his opinion, that a morbid effluvium proceeds from the eyes in ophthalmia, which, through the medium of the atmosphere, will affect those that are near. The same opinion is stated by Mercurialis (*Prax.* lib. i. cap. 38.). Diemerbroeck (*Observat.* 55.) mentions the case of a lady who was attacked by the complaint, and two or three days afterwards three of her servants were also seized. He arrested the disorder by the following collyrium: —

℞ Zinci Sulphatis ℈j.; Sacchari Candi ʒj.; Aquæ Plantaginis ℥ij.; Aq. Rosarum ℥j. M.

Similar facts and opinions are to be found in the writings of Riedlin (*Curat. Med. Millen. Observ.* 187.), Wedel (*De Ophthal.* Jenæ, 1684.), and Boerhaave (*De Morbis Nervorum*, ii. p. 512.). Dr. Edmondston has adduced a very striking fact, about to be referred to, from the thesis of a Dr. Armstrong. From this it will appear, that although the contagious nature of the disease was not fully shown, nor generally believed in, until it was demonstrated by Dr. Edmondston, yet it did not altogether escape the notice of writers; some of whom, as Diemerbroeck, were at a loss to account for the facts they observed; or to explain how a virus could be conveyed, through the medium of the air, from the eyes of the diseased to those of mere spectators. The vulgar belief, however, in its contagious nature, has long subsisted in various countries; but the vulgar judge by results and assemblages of facts, without caring for the explanation, or disbelieving them because they are unable to account for them; and they often judge aright.

sani, Graeffe, and others, produced the disease repeatedly in dogs and cats by the application of matter to their eyes; and M. Guillié introduced under the eyelids of four blind children the purulent discharge, and the disease was communicated in each instance.

35. But independently of these incontrovertble facts, others equally satisfactory may be adduced. It is not denied that the disease extended from the detachments of the French and English armies which returned from Egypt, to the troops in Italy, Sicily, Malta, Gibraltar, France, and England, which had direct communication with them; the progress of the complaint having been clearly traced from the infected detachments to the fresh troops. The excellent accounts furnished by Dr. Edmondston, Vetch, Macgregor, Rust, Walther, Mueller, Graeffe, and others, completely demonstrate its spread by contagion, and show that it extends rapidly among soldiers crowded in barracks, using the same utensils and linen, whilst the officers, who live separately, are seldom attacked. Rust states that, in Mentz, which was garrisoned by Prussians and Austrians, it spread extensively among the former; while the latter, who inhabited separate barracks, in a different quarter of the town, entirely escaped. Dr. Edmondston adduces a most conclusive fact. In 1782, the Albemarle ship of war took on board, in the West Indies, three sailors, with inflamed eyes, from a slave-ship, in which the disease prevailed. On the fourth day after their reception, the disorder appeared in the Albemarle; and, by the seventh morning, twenty-two men were unfit for duty. Those affected were now separated from the healthy, and the progress of the malady was arrested, and, in the course of a few weeks, entirely ceased. Similar facts to the above may be adduced; and most of those about to be noticed in illustration of points connected with this subject, fully prove contagion. Numerous instances have occurred in civil life, of the disease extending from one, to all the members of a family; and, in the public service, where the circumstances favouring its spread are more numerous and influential than elsewhere, it has been arrested by separating the diseased from the healthy, and confining each person to his own utensils, cloths, and sponges. Mr. Macgregor states that, when the complaint was spreading rapidly in the spring of 1810, among the children of the Military Asylum, those affected were removed into a detached building, so as to cut off the communication between the healthy and diseased; and that it afterwards declined. That it did not arise from the state of the air, or any other general cause, is shown by the circumstance of its prevalence among the boys for nearly a month, before the girls were attacked; and by the fact, that all the adults who did not mix with the sick escaped, while those who were connected with them all suffered, the assistant surgeon excepted. Similar proofs are adduced by Rust, Walther, and Omodei, in the works referred to in the *Bibliography*. Mr. Macgregor has given a most convincing account of its extension, by contagion, from two boys, brothers, in the Military Asylum, in his Memoir referred to hereafter.

36. 3d. *The origin of the contagious property, and the manner of, and the circumstances favouring, its propagation,* are matters of great practical importance, as respects both prophylactic and curative measures.—(*a*) As to the *origin* of the contagion, Dr. Vetch has made an important observation, and one which appears to approach very nearly to the truth. He remarks that, from whatever cause inflammation of the conjunctiva may originate, when the action is of such a nature or degree as to produce a purulent discharge (*Ophthalmo-blennorrhœa*), the discharge so produced operates as an animal virus when applied to the conjunctiva of a healthy eye. To this I would merely add, of a predisposed or susceptible person.—The opinion of Mr. Mackenzie agrees with that now stated. He observes, that it scarcely admits of a doubt, that the discharge in *catarrhal* ophthalmia, especially when distinctly puriform, if conveyed by a towel, or by the fingers, to the eyes of other persons, will excite a conjunctivitis still more severe, more distinctly puriform, and more dangerous in its effects, than was the original affection. He has arrived at this conclusion, from having observed many instances, in which the disease had arisen in one of a family from atmospheric exposure, and several others had become affected, it having been, in the first attacked, comparatively moderate, but, in the rest, much more violent and puriform. Similar facts have been remarked by myself. That the disease may arise spontaneously, and afterwards extend by contagion, is evinced by the following occurrence adduced by M. Guillié. A French slave-ship left the coast of Africa in 1819, with 160 slaves crowded in the hold. No case of ophthalmia existed among them, nor among the crew, when they put to sea. But fifteen days afterwards it broke out in the negroes, and spread rapidly among them, and subsequently among the crew, twenty-two in number, one only of whom escaped. On their passage across the Atlantic to the West Indies, they met another slave-ship, the crew of which was similarly circumstanced to themselves. Nearly one half of the crew and slaves lost their sight in one or both eyes.

37. (*b*) As to the *manner* of the propagation of the disease, some difference of opinion is entertained. Dr. Vetch believes that it is not communicable by a contagious miasm conveyed through the medium of the atmosphere; and thinks that direct application of matter is necessary to infection. Mr. Macgregor expresses a similar opinion, although many of his facts favour the conclusion at which I shall arrive in the sequel. Mueller, on the other hand, considers that the contagion is generally conveyed by the air, although it necessarily also admits of being propagated by direct contact; and, in proof of this position, adduces the fact of the medical attendants and nurses, notwithstanding their care to avoid the contact of the discharge, having been frequently affected. Walther entertains the same opinion, and appeals to similar facts in support of it. Dr. Edmondston, the first writer who demonstrated the contagious nature of the complaint, and attempted to assign the range and laws of this property in respect of it, considers that it is contagious, not only by the contact of the discharge, but also by fomites, and through the medium of the atmosphere within a limited range, when a number of cases are brought

together, in close apartments or crowded hospitals. Such appears to be the opinion of this able physician, promulgated as early as 1802; and, although not always candidly objected to at the time, and for some years afterwards, it is now confirmed in every respect by the more recent experience of the best writers on the disease in this country and on the Continent.

38. (*c*) The *circumstances favouring* the diffusion of this contagion are in no respects different from those which promote the spread of other contagions: — 1st. Novelty of morbid impression, or the unblunted sensibility and unimpaired susceptibility of those who are exposed to the infectious miasm for the first time; as a person coming out of a pure air into a foul atmosphere or close apartment, or breathing an effluvium to which he has heretofore been a stranger, is much more sensible of its operation, and much more affected by it, than one who has gradually become accustomed to it by frequent or continued exposure. — 2d. Whatever increases the discharge, or accumulates or concentrates the emanations from it, and from the diseased organ; as want of ventilation, crowding together of the sick, want of cleanliness, &c.; will greatly increase the contamination of the air more immediately surrounding the patient, and favour the infection of the healthy who are most susceptible, when they approach within a certain limited range. — 3d. Whatever multiplies the chances of conveying the morbid secretion directly to the eyes of the sound; as sleeping in the same bed or apartment, using the same towels, sponges, and utensils, and the want of domestic cleanliness; will augment the number of cases. — 4th. Whatever depresses the vital powers; as unwholesome diet, insufficient clothing, intoxication, exposure to cold, &c., fatigue, malaria, a confined or foul air, the depressing passions, and venereal excesses; will render persons more susceptible of infection.—And, 5th. Exposure to the more common causes of ophthalmia about the same time as to contagion, or shortly before or after it, will likewise assist or determine its influence. — It is hardly requisite to appeal to facts in support of these positions. The numerous works referred to furnish them in abundance, especially those of EDMONDSTON, MACGREGOR, and VETCH. Mr. MACGREGOR found that the complaint was much more severe and of longer duration in hot and moist, than in cold, weather; and Dr. VETCH ascertained that a humid atmosphere and marshy soil increased both its violence and spread.

39. From the above, it may be *inferred* — 1st, that the disease may be produced by common causes, and without the operation of contagion; — 2dly, that, when so excited, and existing to such a degree as to give rise to a puriform discharge, it is capable of propagating itself, under favourable or particular circumstances; — 3dly, that it spreads, not only by contact, but also through the medium of the atmosphere, within narrow limits; more especially when numbers affected by it are crowded together, and the air is humid or impure, and those exposed to the contagion are predisposed by the operation of the causes mentioned above (§ 4.). Hence its remarkable virulency in ships, particularly transports, slave-ships, barracks, prisons, workhouses, and schools; and it therefore should be referred to the *second* category, stated at the commencement of the enquiry (§ 32.).

40. β. *Symptoms and Progress.*—The symptoms succeed each other with different degrees of rapidity and severity, even in persons suffering from the same infection, and in the same place, owing to the previous health, the habits, and constitution of the patients. The disease is more mild in females than in males; and it is more violent about the period of puberty than at an earlier or later age. It has also been more severe in one place, or regiment, than in another; and it was evidently more violent among the British troops, than among the French, Germans, or Italians, owing most probably to the more phlogistic diathesis and robust constitutions of the former than of the latter, and to their fuller living and greater intemperance.

41. (*a*) *The more acute and violent states.*— In its *first stage*, the complaint is confined to the palpebral conjunctiva; and is attended by stiffness of the lids, itching or watering of the eye, a sense of sand or some foreign body below the lids, succeeded by sticking of them together, on wakening from sleep, and greater fulness of them externally than usual. — It is seldom seen by the physician at this period; or until it has advanced to the conjunctiva oculi, or its *second stage*. This membrane then rapidly becomes bright red, remarkably vascular, and greatly swollen; the chemosis being sometimes such as to conceal the cornea. Patches of ecchymosis are also seen, and the whole palpebræ are much tumefied, and occasionally also red externally. The discharge is profuse and purulent, often in a few hours from the commencement, but always soon after the inflammation has extended to the globe; and sometimes it is so copious as to pour over the face and clothes; but there is no secretion of pus in the chambers. In this stage, the pain becomes severe, seated deep in the eye, and attended by a sense of a foreign body in the eye, of fulness or great distension, with throbbing in the temples, and headach. These symptoms, especially the pain, often remit, or occur in paroxysms, or return after having been removed for a time. The *constitutional disturbance* is not severe; the pulse, tongue, and appetite, not being materially affected. The cornea is liable to the same effects as have been described above (§ 24, 25.); but the swelling of the lids, and the tumefaction and overlapping of the conjunctiva, and the accumulation of pus over the cornea, or in the depression of which it forms the bottom, frequently prevent its state from being ascertained. —In the *third stage*, the symptoms gradually subside; the swelling, pain, and discharge are diminished; the external tumefaction is lessened; and the lids, which before were somewhat inverted, from the cartilages not yielding, are now slightly everted, especially the lower. As the discharge diminishes, it gradually loses its purulent characters, and becomes thinner, more mucous, or gleety. The internal surface of the eyelids, the semilunar membrane, and caruncula lachrymalis, which were the first parts affected, are the last from which the disease disappears. The right eye is more frequently, and generally more severely, attacked than the left; and its sight oftener lost. In some cases, only one eye is affected; but commonly both are seized, although an interval

of several days occur before the second becomes inflamed. Such are the features of this disease as it prevailed in the British army, and as it sometimes occurs in civil life under certain circumstances.

42. (*b*) *The milder or chronic states.* — These were most common on the Continent, both in the army and in civil society. Mr. MACGREGOR, Dr. VETCH, Professor WALTHER, and Dr. MUELLER, particularly the last, have pointed out, not only the origin of the complaint, in the conjunctiva of the lids, but also its long persistence in this part, in some cases, and its entire limitation to it, in others. In all the grades, the inflammation both begins and terminates in it. — In the *slightest grades*, the patient complains of pressure or uneasiness, with a sense of dust or sand, in the eye; but without redness of the globe, or of the external surface of the palpebræ. The conjunctiva tarsi is villous and dark red; but towards the globe it is smooth, and its vessels distended. The eyeball has an irritated appearance: there are an increased flow of tears, and a mucous secretion, but little or no pain. The disease may continue long in this mild form, or may yield to treatment in two or three weeks; or it may pass into a higher or severer grade.— The *second or intermediate degree* may be an aggravation of the first or slightest grade, or may commence with all its characteristic features. The conjunctiva of the lids has a granular appearance, which becomes more conspicuous when the inflammatory tension is abated, and is swollen, dark red, and covered by a puriform secretion. The lids are tumefied; the pain is considerable, and as if caused by a foreign body. This form may continue for weeks or even months, and pass into the severe or acute state already described (§ 41.), owing to atmospheric changes or other causes; unfavourable consequences to the organ supervening sometimes in twenty-four or thirty-six hours.

43. (*c*) The *alterations* which the conjunctiva undergoes are of much importance. In the mildest grade, the membrane appears as if covered with dust, or velvety; in the severest degrees, it seems strewed with rough bodies, or with granulations, resembling those of a healing wound. These bodies exist in great number, arise by a broad basis, and have a round prominence at first, which becomes flattened or angular, by pressure against the globe. The largest of them are in the middle of the lid, the smallest at the edge and near the angles. They are sometimes crowded very close, and are most remarkable in the upper lid. Their colour varies from the darkest blood red to the palest brick hue. MUELLER considers this change of structure not as a mere effect of inflammation, but as proper to the disease, and as connected with the production of the contagious secretion disseminating the complaint.

44. γ. *Consequences.* — 1. *Suppuration of the Cornea*, and destruction by ulceration, sometimes supervene; the progress of the disease usually leading to the escape of the humours, and collapse of the globe. — 2. *Ulceration* frequently takes place, to the extent, and in the manner, described above (§ 24, 25.). — 3. *Sloughing of the cornea* rarely or never occurs in this variety. Mr. LAWRENCE has not met with it, and other writers do not mention it. — 4. *Bursting of the cornea* is less rare, particularly during suppuration or ulceration. Dr. VETCH met with cases, in which the rupture occurred without previous change; the aqueous humour having escaped by a clear division or rent in the cornea, which afterwards became opaque, and projected around the opening; but this occurrence is very seldom observed.—5. *Interstitial deposition* in the conjunctival covering, or the corneal laminæ, occasioning opacity of every degree; the slighter grades often disappearing after recovery. — 6. *Loosening or thickening of the mucous membrane* covering the cornea, with enlargement of its vessels, and diminution of its transparency. — 7. *Opacity* from cicatrisation of ulcers. — 8. *Prolapse of the iris*, partial or total (*Staphyloma racemosum*). — 9. *Adhesion of the iris to the cornea* (*Synechia anterior*), either with or without prolapse. — 10. *Staphyloma*, general or partial, or other changes, from extension of the inflammation to internal parts of the organ. —11. *Weakness or irritability of the eyes*, which usually disappears sooner or later. — 12. *Impaired vision* (*Amblyopia*), arising from numerous causes; as turgidity of vessels in the orbit, and surrounding the optic nerves; slight alterations of the choroid, retina, or lens; and lesions within the cranium. — 13. *Thickening, induration, and granulation of the conjunctiva* of the lids.—14. *Temporary and permanent ectropium and entropium.* — And, 15. A *great tendency to relapse*, upon exposure to very slight causes. This last especially occurs, when the palpebral conjunctiva has not been restored to its natural state, — a result not readily attained after severe or prolonged attacks, and which WALTHER doubts ever to be entirely accomplished. Hence a person may be considered as cured, but experience a return of the complaint, from exposure to cold or intoxication, and may spread the disease in the family in which he resides.

45. δ. *Diagnosis.* — Purulent ophthalmia in the adult may be mistaken for the *catarrhal* and *gonorrhœal* varieties. The peculiar change in the palpebral conjunctiva, the great chemosis and swelling of the lids, the extreme redness and vascular congestion, the profuse purulent discharge, the long continuance of the complaint, its tendency to affect the cornea, and the disposition to relapses, sufficiently distinguish it from *catarrhal* or mild ophthalmia. Nevertheless, the mildest cases of the former, and the severest of the latter, hardly differ in any respect. The specific cause and nature of *gonorrhœal* ophthalmia, and its uniformly acute and violent form, distinguish it from the purulent variety. There are, besides, other differences, which will be noticed hereafter (§ 59.).

46. ε. *Treatment.* — (*a*) *Of the most acute, or highest grade of the disease.* — The *intention* should be to arrest the violence of the inflammation, and prevent the extension of it to the cornea. If the patient be seen sufficiently early, or before the conjunctiva oculi be much inflamed, or chemosis have appeared, the treatment advised in catarrhal ophthalmia will generally succeed. But, if the disease be thus far advanced, and has assumed a severe form, the most active antiphlogistic means ought to be resorted to. VETCH, MUELLER, RUST, WALTHER, LAWRENCE, and other experienced writers, recommend *venæsection* carried at once sufficiently far to produce a decided effect upon the circulation, without regard

to the quantity abstracted. Drs. EDMONDSTON, MACKENZIE, and JACOB place much less reliance upon large general bloodlettings, which have but little effect upon the local inflammation. This opinion coincides with the result of my own limited experience. Dr. JACOB has seen the abstraction of blood carried to the utmost extent; "he has seen repeated bleedings of forty, fifty, and even sixty ounces, and streams flowing from the arm and temporal artery at the same time, without generally beneficial results." After one full bloodletting, these writers coincide in trusting chiefly to *local depletions*, by cupping in the temples, by the application of from twenty to thirty leeches over the cheek-bone and temple, and by *scarifications* of the inflamed conjunctiva. This last is advised chiefly by Dr. EDMONDSTON and Mr. MACKENZIE; but it is objected to by Mr. LAWRENCE, on the grounds that the wounds thus inflicted increase the local irritation; in the most severe cases, however, the advantage accruing from the practice far outweighs any inconvenience contingent on it. Mr. MACKENZIE places scarification of the conjunctiva among the most effectual means of combating the contagious ophthalmia; but makes no mention of Dr. EDMONDSTON, who, many years before, strongly insisted on this practice. When the chemosis is great, SCARPA and WALTHER recommend a portion of the conjunctiva to be cut out, either from the eyelid or the globe; several drachms of blood usually flowing from the incision, with great relief to the symptoms. When the tumefaction is such as to project the membrane between the lids, or to overlap the cornea, Dr. JACOB directs an extracting knife to be run from one end of the tumour to the other, the effused serum and much blood generally escaping by this means.

47. Having practised bloodletting so as to make an impression on the circulation, conformably with the principles espoused in other places (see BLOOD, § 64, 65.), and immediately afterwards applied leeches, or scarified the conjunctiva, according to circumstances, full doses of *calomel*, *antimony*, or James's powder, and *opium*, conjoined, should be immediately taken, and followed, in a few hours, by a brisk *purgative*, and this latter, by a *cathartic* enema. If the calomel, antimony, and opium have been exhibited for the first time in the morning, they may be given again at bedtime, if the case be very acute; the cathartic being repeated at an early hour in the morning. If the tongue be loaded, or the stomach disordered, an antimonial *emetic* should follow the bloodletting, and precede the medicines now directed, which should be given soon after the full operation of the emetic, and repeated according to their effects. Having thus acted upon the circulation and the *primæ viæ*, without materially diminishing the local action and pain, *diaphoretics* and *nauseants* may be resorted to. Full doses of DOVER's powder, or *antimony* conjoined with *opium*, promoting their operation by *diluents* and *pediluvia*, will generally be of much service. *Nausea* kept up by these medicines is sometimes of use, in the more severe or obstinate cases, before the cornea is affected; but under other circumstances, it is seldom beneficial. The same remark is applicable to mercury exhibited with the intention of affecting the system. The most efficient and certain derivative cathartics, in this disease, are equal quantities of castor oil and spirits of turpentine, the same being exhibited in enemata (F. 151.); but they should not supersede the other means. The antiphlogistic treatment ought to be strictly enforced in an early stage of the disease, particularly in robust, phlogistic, and well-fed persons. In the *dark-skinned races*, as well as in persons of relaxed or cachectic habits, bloodletting is injurious; and even local depletions should be cautiously prescribed.

48. The *local Treatment* is even more important than the constitutional. After local bleedings, the frequent application of cloths moistened with *cold water*, or vinegar and water, and, when the headach is urgent, or the chemosis great, the *cold effusion* on the head, repeated twice or thrice daily, are favourably mentioned by WALTHER, VETCH, GERICKÉ, and LAWRENCE. If the cold applications cannot be borne, or if there be spasm of the lids, *warm fomentations* may be used for a short time; but they should not be long persisted in, or too frequently repeated, unless they be alternated with astringents. *Tepid ablution* is, however, both serviceable and requisite. Cold or warm applications should, therefore, be employed according to circumstances. Mr. TRAVERS prefers those that are tepid, in the painfully acute stage. Whichever be adopted, ought to be carefully attended to by the practitioner himself. As soon as the conjunctiva becomes somewhat paler, or appears flabby, *astringent applications* ought no longer to be withheld. In relaxed habits they should be very early applied, or immediately follow the local depletion. Mr. MELIN and Dr. O'HALLORAN, from having been dissatisfied with the antiphlogistic treatment, were led to the use of powerful astringents, not only in the first stage, but also when the purulent discharge and chemosis were fully established. Dr. O'HALLORAN used, once a day, either the sulphate of copper in substance, rubbing it on the inner surface of the eyelids after everting them; or the nitrate of silver, dropping a ten grain solution of it on the eye. He also applied fomentations, and gave purgatives. If the symptoms indicated the extension of the inflammation to internal parts of the eye, then only he directed leeches.

49. Mr. GUTHRIE, considering the nitrate of silver in solution to be ineffective, in the most severe cases, recommends an ointment, made with ten grains of this salt, reduced to an impalpable powder, and thoroughly incorporated with a drachm of lard, to be inserted between the lids. The eyes ought previously to be well cleansed with a tepid solution of alum; and when the ointment is inserted, the lids are to be moved freely, so that the whole conjunctiva receives it. If the membrane become white, it is satisfactorily applied; if not, the ointment should be rubbed on the inside of the lids. He also directs the patient to be bled fully, and until an impression is made upon the pulse; he employs warm narcotic fomentations to the eye; exhibits an opiate internally; injects, from time to time, a weak solution of alum under the lids, to wash away the discharge; and applies a mild ointment to them at night, to prevent their adhering together. The next morning, the discharge is again

to be removed, and the strong ointment re-applied, so that the new action that should be set up may not cease; the other remedies are likewise to be continued. In addition to these, he gives calomel and opium, so as to affect the mouth; and the other more common remedies.

50. As different writers prescribe different astringents, and of various grades of strength, it were desirable that some more precise knowledge were attained as to which is the safest and most efficient. Dr. Jacob, after passing acetate of lead, alum, sulphate of copper, sulphate of zinc, corrosive sublimate, and lunar caustic, in review, decides in favour of the undiluted liquor plumbi acetatis, and strong solutions of alum, or of the nitrate of silver; which, however, he recommends after the painfully acute stage has passed, and in the chronic or atonic state of the complaint. Mr. Mackenzie directs a tepid solution of one grain of corrosive sublimate in eight ounces of water, to be injected under the lids, for the purpose of cleaning the eyes; and, as an astringent, four grains of the nitrate of silver, or six of the sulphate of copper, dissolved in an ounce of distilled water. The solution of alum, or of the oxymuriate of mercury (j.—ij. gr. to ℥ j.) may likewise be tried. Mueller prescribes one, two, or three drops of sulphuric acid, or two or three grains of acetate of copper, in an ounce of water. Mr. Briggs states, that a minute quantity of the oleum terebinthinæ introduced between the lids every morning, on the point of a camel-hair pencil, the eye being afterwards bathed with cold water, is most efficacious in checking the profuse discharge.

51. It will be observed, from the foregoing, that some difference of opinion exists as to when the use of active astringents should be commenced. The majority of authorities, as Edmondston, Vetch, Mackenzie, Lawrence, Jacob, &c., resorting to local depletions, and soothing or anodyne applications, in the early, acutely painful, or active inflammatory stage, and to strong astringents, when this stage is removed, and the chronic or atonic condition has commenced; whilst some military authorities, as Melin, O'Halloran, and Guthrie, advise the adoption of powerful astringents from the beginning. I agree, however, with the former; and with them consider, that the effects of astringents should be carefully watched, when early, or even at first employed; and, if the redness be increased by them, that they should be laid aside for a time, and antiphlogistic remedies adopted. The *citrine* or red *precipitate ointment* should be applied to the edges of the lids at night.

52. In the *dark races*, astringents ought to be early and energetically employed. Among the negro tribes, *vegetable astringents* and *stimulants*, especially lime-juice, are entirely confided in. The astringents above noticed are, however, equally appropriate in them; and the addition of anodynes, particularly opium and camphor, is also of service, with pure air, and suitable diet.

53. *Blisters* to the nape of the neck, or behind the ears, are sometimes serviceable, especially when kept open for some time. When the pain is very distressing in the acute stage, relief is afforded by the *steam of hot water*, to which *laudanum* and *camphor* have been added; and the *vinum opii* is often a useful application, when the conjunctiva is relaxed and painful upon the disappearance of the discharge. *Evacuation of the aqueous humour* by incision has been recommended by Mr. Wardrop, in order to remove the bursting pain in the eyes and forehead, and practised in twenty-three cases by Mr. Macgregor, from a dread of rupture of the cornea. In the advanced stage of the disease, exercise in the open air, exposure of the eye to as much light as it will bear, and the use of *gentle tonics*, with a free state of all the excretions, are serviceable. If, after depletions, the eye becomes irritable, or the pain intermittent or periodical, the preparations of *bark*, with the *mineral acids*, as Mueller advises, will be of benefit. If *ulceration of the cornea* have commenced, a tonic and stimulating treatment is required, especially if it spread and be attended by debility. When *ectropium* of the lower lid remains after the inflammation is gone, and presents a red fleshy mass, Mr. Lawrence directs the application of the nitrate of silver in substance to it.

54. (*b*) *Treatment of the milder grades.*—If the inflammation have extended to the conjunctiva oculi, however slight, *local depletion*, low diet, and *purgatives* should be directed. When active disorder is removed by these, the application of *astringents* to the diseased surface of the eyelids should be entered upon, and continued until the morbid state of this part described above (§ 43.) is entirely removed. The solution of alum, or of nitrate of silver, or of sulphate of copper, the strength of which should be gradually increased, or the undiluted liquor plumbi, ought to be dropped into the eye, once or twice a day, the citrine ointment being applied to the margins of the lids at night. Exercise in the open air, free exposure of the eyes, and due regulation of all the natural functions, are beneficial. Mueller recommends mercurial ointments to be rubbed over the diseased surface of the lids once or twice daily.

55. *When the palpebral conjunctiva becomes altered, or granulated*, in the chronic state, as above described (§ 43.), very active local means are necessary, as the irritation occasioned by the morbid surface produces vascularity and opacity of the cornea, or loosening and thickening of its conjunctival layer — or *pannus*. With the change in the surface of the eye-lids, may be associated some one of the unfavourable results of the more violent attacks, as leucoma, synechia anterior, staphyloma, &c.—Mr. Lawrence remarks that, if the globe be free from irritation, the *astringents* already specified, particularly a solution of twenty or thirty grains of nitrate of silver in an ounce of water, should be applied to the granulated surface, with a camel-hair pencil; the lids being everted. If this be not sufficient, *escharotics*, beginning with the weaker, and proceeding to the strongest, must be used. In order to prevent their injurious action on the conjunctiva oculi, the lids should be everted, the diseased part only touched, and they ought to be kept everted until the effect is produced. The acetate of copper, the sulphate of copper, or the nitrate of silver — the strongest — should be lightly applied to the granulated surface, previously freed from moisture; and, after waiting a minute or two, the lid should be carefully washed and restored. These applications cause severe pain,

redness, and swelling, with increased discharge, and should not be repeated until these effects have disappeared, which may not take place for five, seven, or eight days. In the intervals of the escharotics, some astringent solution may be applied. Mr. Lawrence and Professor Walther do not speak very favourably of this plan; and are more disposed to depend upon antiphlogistic means in the first instance, and the subsequent use of astringents, as above directed, with regulation of diet and of the digestive organs, residence in a pure air, exercise, and a moderate use of the organ. Rapid improvement, Mr. Lawrence states, sometimes has followed the substitution of soothing applications for strong astringents.

C. Gonorrhœal Ophthalmia. — Syn. *Gonorrhœal Inflammation of the Conjunctiva; Specific Ophthalmia; Conjunctivitis specifica; Ophthalmia Gonorrhoica vera*, Beer.

56. *This is a violent inflammation of the mucous membrane of the eyelids and globe, attended with a profuse discharge of a fluid closely resembling that which issues from the urethra in gonorrhœa, and occurring in some kind of connection with that complaint.*—It is the most violent and rapidly destructive inflammation to which the eye is subject; fortunately it is one of the most rare. It sometimes destroys the eye within a very short time; or irreparably injures it before medical aid is resorted to, especially in the lower classes. Mr. Mackenzie divides it into — 1st, that from inoculation; 2d, from metastasis; and, 3d, without inoculation or metastasis. Mr. Lawrence distinguishes three forms: — *a*. Acute gonorrhœal inflammation of the conjunctiva; —*b*. Mild inflammation of this membrane; — and, *c*. Gonorrhœal inflammation of the sclerotic coat. I shall here consider chiefly the former; the third form being merely rheumatic ophthalmia, occurring, like other rheumatic affections, in connection with gonorrhœa.

57. *a. Symptoms and Progress.*— *Acute gonorrhœal ophthalmia* presents all the fully developed characters of purulent ophthalmia. Mr. Lawrence distinguishes three stages; which, however, are not very clearly evinced, although the division is judicious. In the *first stage*, which is short, the inflammation is confined to the conjunctiva, and is attended with a sensation of sand in the eye, and soreness, stiffness, uneasiness on exposure to light, and a thin whitish mucous secretion. Extreme vascular congestion, intense and general redness, excessive tumefaction of the conjunctiva, great chemosis, and swelling of the lids, supervene; especially as the disease approaches the *second stage*, which is characterised by a profuse discharge of thick yellow matter, closely resembling in its appearance, and in the stain it communicates to linen, the gonorrhœal secretion. When the discharge is established, the inflammation causes effusion into the cellular tissue connecting the conjunctiva to the surrounding parts. Hence the very remarkable chemosis, which is sometimes so extreme, as to overlap or hide the cornea; and the palpebral swelling and enlargement, which is occasionally very great. The affection soon extends to the cornea, constituting the *third stage*, with agonising pain in the globe, orbit, and head, augmented on exposure to light, and attended by symptomatic inflammatory fever. The danger to the organ is now most imminent. The swelling of the lids and chemosis render it difficult, or even impossible, to obtain a view of the cornea. When this is the case, attempts to attain this end should not be made so as to increase the symptoms. Although pain is most acute in both the eye and head, as in other instances when the unyielding cornea is the seat of inflammation; and although patients often complain of burning pain, of tension as if the eye would burst, with deep-seated suffering extending to the brow, forehead, and head, there are some instances in which little or no pain is felt. The symptoms are, however, not equally violent through the whole course of the complaint; and the *duration* of the *stages* varies with the constitution and health of the patient, and the treatment adopted. The *first* and *second*, particularly the first, usually passes away rapidly.

58. *b. Consequences.*—The immediate effects of the inflammation on the cornea are sloughing, suppuration, ulceration, and interstitial deposition; these changes leading to escape of the humours and collapse of the globe, obliteration of the anterior chamber, and flattening of the front of the eye, staphyloma, prolapse of the iris, obliteration of the pupil, opacity of the cornea, and anterior adhesion of the iris. Sufficient notice has already been taken of each of these lesions; as they do not differ from those supervening upon the other varieties of purulent ophthalmia, although they more rapidly appear, and in severer forms, than in them.

59. *c. Diagnosis.*—The severest grade of *purulent* ophthalmia closely resembles the acute *gonorrhœal.* In the latter, however, the swelling of the conjunctiva oculi is greater, and that of the eyelids somewhat less, than in the former. The discharge, however, is thicker, and perhaps more abundant, and the constitutional disturbance greater, in the gonorrhœal, in which the peculiar granulated change of the conjunctiva of the lids does not occur. In purulent ophthalmia, the disease begins in the lids, and advances gradually; but in the gonorrhœal, it seems to commence in the conjunctiva oculi: in one case, Mr. Lawrence saw it distinctly begin there; and it attacks most violently and proceeds most rapidly. The former generally continues long, affects both eyes, remits, or returns, rarely destroys the eye by sloughing, and is much less destructive; whilst the latter more frequently affects only one eye, and the cornea is much oftener destroyed by sloughing. This disease is uncommon, occurs in single instances, and in persons who have had, or who still have, gonorrhœa; whilst purulent ophthalmia usually affects numbers, particularly when many live together.

60. *d. Prognosis.*— Nine cases out of fourteen related by Mr. Lawrence in his treatise on this disease, were seated in one eye; out of the fourteen, loss of vision took place in nine cases from sloughing, suppuration, or opacity of the cornea. In two cases, one eye was lost and the other recovered. Sight was restored in the other five, with partial opacity of the cornea and anterior adhesion of the iris in three of the number. This writer adds, that so short a period intervenes between the commencement and full development of the complaint, that irreparable mischief

is generally done to the eye before aid is resorted to. In the *first* or *second* stage, its progress may be arrested; but success even thus early must not be reckoned upon. If the cornea still possess its natural clearness, the eye may be saved; but if it have become hazy or dull, and particularly if it be white or nebulous, serious consequences will ensue. Sight may, however, be restored after partial sloughing of the cornea; and ulceration may occur in its circumference without injury to vision. When both eyes are successively attacked, the disease is often less severe in the second, which, therefore, is saved; but exceptions to this occasionally occur, the sight of both being lost.

61. *e. Causes.* — Dr. VETCH found that the matter of acute purulent ophthalmia, applied to the urethra of the same individual, excited no disease; but that, when it was applied to the urethra of another person, it produced a virulent gonorrhœa: he therefore infers that the matter from the urethra, coming in contact with the eye of the same individual, would not occasion gonorrhœal ophthalmia. But Mr. MACKENZIE, Mr. LAWRENCE, and Dr. JACOB, adduce cases from their own practice, which were produced in this way, and refer to others from WARDROP, ASTRUC, ALLAN, and FOOT. It has been incidentally mentioned by SCARPA and BEER, that gonorrhœal matter applied to the eye excites only slight inflammation; but they do not refer to the source whence it was derived—whether from the same person or from another. The cases observed by LAWRENCE and the other writers just mentioned, show that this statement does not hold in respect of the same person, and that he may infect himself, although such infection is not so frequent, as the inattention of gonorrhœal patients, particularly in the lower classes, would lead us to expect; and the experience of WARDROP, DELPECH, BACOT, ALLAN, and MACKENZIE fully proves that the disease may be caused by the application of gonorrhœal matter from a different person, although, for obvious reasons, this cannot be a frequent occurrence. It is, therefore, placed beyond doubt, by the cases observed by the above writers, that the complaint may be caused by the contact of gonorrhœal matter — 1st, from the same individual, and, 2dly, from another. But as, in the greater proportion of cases of gonorrhœal ophthalmia, no application of matter, either from the same or another individual, can be traced, in what other way does the disease arise? It has been very generally imputed to metastasis in all such; and the discharge from the urethra has been said to be suppressed by ST. YVES, RICHTER, SCARPA, and BEER, but erroneously, as contended by DELPECH and LAWRENCE. In the cases which this last writer has recorded, the discharge was not stopped in any one, although it was generally lessened, but in some not at all. He therefore concludes that, since the complaint may occur while the discharge from the urethra continues, and since it does not take place when that discharge is stopped, we cannot admit that it owes its origin to the cessation of the urethral discharge. This supposed metastatic form he refers to the state of the constitution, considering it as analogous to those successive attacks of different parts which are observed in gout and rheumatism; and he remarks that, although direct infection operates equally on the eyes of both sexes, this particular form seems confined to the male. BEER says that he has observed it only in young, robust, and plethoric men.

62. *f. Treatment.* — The antiphlogistic plan, and particularly vascular depletion, has been carried to the utmost extent, sometimes with complete, but as often with only partial, success. Of six cases which Mr. LAWRENCE saw at an early period, and treated by *extensive depletion*, general and local, loss of the eye occurred in one only, — a most satisfactory evidence of the propriety of the practice. But whenever the disease comes late under treatment, no plan can succeed, so violent and rapid is the disease. The application of strong *astringents* and *escharotics* to the eye, in order to arrest its progress, has been advised, as its consequences have been so destructive to the organ; and the nitrate of silver ointment, already described (§ 49.), has been recommended by Mr. GUTHRIE. The success of this practice in the severe purulent ophthalmia, warrants its adoption in this; and active depletions, found so successful by Mr. LAWRENCE, in an early stage, may precede it. One circumstance, however, may militate against our inferences in favour of it, namely, the original and principal seat of disease being in the palpebral conjunctiva, in purulent, and in the conjunctiva oculi, in gonorrhœal, ophthalmia, the pathological states are not therefore the same in both. Notwithstanding, both modes of practice may be conjoined with advantage, as Dr. JACOB suggests. The oleum terebinthinæ, dropped into the eye, is deserving of trial.

63. Large and repeated *bloodlettings* from the arm or jugular vein, followed by local depletion and the remedies above advised (§ 62.), are, in the present state of our knowledge, most to be depended upon. But if sloughing or suppuration of the cornea have occurred, this treatment will be of no service. Mr. LAWRENCE has seen mercury employed without any advantage, and he places no reliance on the reproduction of the urethral discharge, as advised by RICHTER, SCARPA, and BEER. He also thinks *blisters* to be of little use. The eyes should be very frequently cleansed by the usual means. When the inflammatory symptoms have been completely and quickly subdued, the effects will pass off in a little time without astringents and tonics; but when the conjunctiva becomes pale and flabby, and the patient pallid and weak, the purulent discharge being still abundant, *astringents* locally, and *tonics* internally, are usually recommended. When sloughing or ulceration of the cornea is attended by signs of great depression, *quinine* and *generous diet* are necessary, and *astringent lotions* are sometimes of service. Mr. LAWRENCE prefers a solution of from two to ten grains of alum in an ounce of water, the solution of the nitrate of silver, and undiluted liquor plumbi acetatis.

64. *g. Mild gonorrhœal Inflammation of the Conjunctiva.* — Mr. LAWRENCE has described a very slight variety of gonorrhœal ophthalmia, consisting of external redness of a bright scarlet tint, with distension of the superficial vessels of the globe, and increased mucous secretion. In still slighter attacks, the redness is not deep nor gene-

ral, the membrane is not swollen, the secretion is but little increased, and the pain is trifling. The severer grades of this form approach to those of acute purulent ophthalmia, the conjunctiva being red throughout, tumefied, and secreting a copious yellow mucous matter. These milder states of the disease usually occur in patients with gonorrhœa of a rheumatic or gouty diathesis, and most frequently in conjunction with rheumatic affections consequent upon the gonorrhœal disease of the urethra.

65. *h. The Treatment* consists of antiphlogistic remedies, co-ordinate with the severity of the attack, and the strength of the patient; followed by astringent applications — the best of which, in the opinion of Mr. LAWRENCE, is the solution of lunar caustic.

66. *D.* PUSTULAR OPHTHALMIA — *Pustular Inflammation of the Conjunctiva.* — *a.* Inflammation of the conjunctiva, with small *pustules*, or *phlyctenulæ*, sometimes occurs from cold or other causes, and resembles, in its appearance, and occurrence chiefly in persons before puberty, the strumous form of the disease. But it is met with in those who are not strumous; and it does not exhibit the other symptoms of scrofulous or catarrhal ophthalmia: it therefore constitutes a distinct variety. It is characterised by distended fasciculi of vessels upon the conjunctiva, which run towards the cornea, either terminating at its margin, or extending a short way over this boundary, and there form a small reddish or whitish elevation. This elevation contains, at first, a little watery fluid (*Phlyctenæ*), but it afterwards assumes a pustular appearance. Sometimes only one is observed, at others there are a greater number extending around the margin of the cornea. They are usually small; but, when single, they are occasionally as large as a split pea. They are not attended by much pain or intolerance of light. If the complaint is neglected, the pustules may ulcerate, and the ulceration spread.

67. *b. The Treatment* consists in the application of *leeches* and *blisters* in the more acute cases. The disorder generally disappears, under ordinary circumstances, without ulcerating, when due attention is paid to the secretions and excretions: *mild aperients* and a *saturnine lotion* are usually all that are required.

68. *E.* SCROFULOUS OPHTHALMIA. — SYN. *Scrofulous Inflammation of the Conjunctiva*; *Strumous Ophth.*; *Inflam. of the Conjunctiva in Scrofulous Constitutions.* — Scrofulous children are very liable to this disease. It is sometimes the first manifestation of the strumous diathesis; and, if neglected, it often becomes the source of impaired, or entirely lost, vision. It seldom attacks infants before weaning; but, from that period to nine or ten years of age, it is very prevalent; as many as three fourths of the cases of ophthalmia at this period being scrofulous. Sometimes only one eye is affected, at other times both are inflamed from the first; and very often the disease passes from the one to the other. When both are simultaneously attacked, one is usually much worse than the other.

69. *a. Causes.* — *a.* The *predisposing causes* are those of SCROFULA (see that article) which may be very generally referred to climate, air, exercise, food; and to the habits, health, and constitution of the parents. — *β.* The *exciting causes* are exposure to cold and moisture, injuries to the eye, irritating matters in the air, excessive use of the organ; the common causes of catarrhal ophthalmia, or an attack of this complaint; teething, hooping-cough, and more especially cow-pox exanthematous diseases, and porriginous eruptions on the scalp and face. Measles and small-pox very frequently excite it; and JUENGKEN represents vaccination as one of its most common causes. He disapproves of the practice of vaccinating children in the first year; as he considers that a certain degree of constitutional vigour is required to remove from the system the poison introduced by inoculation; and that, when the child is weak or too young, the morbific matter is not thrown off, and calls into action the scrofulous diathesis. BEER states that, in Breslau, where ninety-five cases out of one hundred of ophthalmia in children are scrofulous, the streets are narrow and filthy, and the food of the poorer families unwholesome. Mr. LAWRENCE and Mr. MACKENZIE think that the complaints described by Mr. WARDROP under the denomination of "*Exanthematous Ophthalmia,*" and by Mr. CHRISTIAN under the name of "*Porriginous Ophthalmia,*" belong in every essential respect to the disorder now being considered.

70. *b. Symptoms and Course.*—*External redness* is often inconsiderable, and most apparent at first in the linings of the lids. It is generally only partial in the conjunctiva oculi, particular enlarged vessels, or fasciculi of vessels, running in this situation towards the cornea, and extending over its margin, or stopping short of it. Where the fasciculi terminate, small *phlyctenæ* or *pustules* form, and contain either a little clear or a yellowish fluid. These pustules may be seated on the sclerotica or cornea, but more frequently on the boundary between them; and may be single, or several. Their presence has induced Mr. MACKENZIE to view strumous ophthalmia as an eruptive disease.—The *intolerance of light* is extreme, and characteristic of the complaint. The lids are spasmodically closed, and resist any attempt to open them; and, when opened, the cornea is turned up under the edge of the orbit, and away from the light. The child puts all the muscles into action to protect the organ; and hence a peculiar and characteristic physiognomy is assumed. It seeks the darkest part of the room, or presses its face against the pillow in bed, to escape from the light. This excessive sensibility of the retina (*Photophobia scrofulosa*) is not caused by inflammation, nor is redness even essential to it; for it is often very remarkable where the eye appears almost natural; and the child opens its eyes and sees as well as usual in the dusk. This disordered sensibility is altogether sympathetic and functional; and is dependent, as Mr. LAWRENCE thinks, on the condition of the alimentary canal. I would impute it rather to the state of the organic nervous system.

71. There is a copious flow of tears at the commencement. The external surface of the organ suffers great irritation, extending to the lachrymal gland, so that when we attempt to examine the eye, or to expose it to the light, there is a copious discharge of scalding tears, causing redness of the lids, and excoriating them and the face. Owing to the itching and soreness

thereby occasioned, the child rubs or scratches the parts, which become sore and pustular, and produce a discharge which encrusts; the affection ultimately extending over the face and forehead, and in its worst form resembling *crusta lactea* and *porrigo larvalis*. The edges of the lids are often red, swollen, and painful. There are sometimes an acrid secretion from, and excoriation of, the nostrils; with redness and swelling of the alæ nasi and upper lip. The ears are frequently red and sore, or excoriated behind, and the absorbent glands of the neck are swollen. The bowels are costive, the tongue white or furred, the abdomen distended, the breath fœtid, the appetite is morbid, the head and sometimes the skin are hot, and the child is restless and grinds its teeth when asleep. The symptoms are worse during the day, but remit somewhat in the dusk of evening. The inflammation of the eye may suddenly subside, and return as suddenly; and very slight exciting causes will bring back the complaint; which may thus continue with slight intermission for months, or even for years. The affection of the eyes may also alternate with some other disorder, or symptoms, in remote parts. In the more chronic cases, the health suffers greatly from seclusion from light, air, and exercise; and the patient becomes pale, etiolated, and sickly, with a dry and harsh skin.

72. *c*. The *Consequences* of the disease on the cornea are often serious, although the external redness may not be great. The phlyctenular or pustular elevations in the cornea may subside, leaving *slight opacity*, or considerable thickening of the corneal conjunctiva with greater and more permanent opacity; but they more commonly *ulcerate*, in an irregular form, and with a ragged edge, the ulcers sometimes extending superficially, or making their way through the cornea to the anterior chamber, occasioning prolapse of the iris. The vessels passing over the cornea may, without forming pustules, occasion thickening and opacity, which may proceed so far as to render the whole corneal covering thick and vascular (*Pannus*). *Opacity* from interstitial deposition may also occur, either with or without enlargement of the proper corneal vessels; and, according to Dr. FRORIEP, a brownish red discolouration, from interstitial effusion of blood, may supervene. In addition to the opacity, the external layers of the cornea may yield from the pressure from behind, and form an external protuberance (*Staphyloma*); or adhesion of the iris to the internal surface of the cornea may take place. In some instances, the inflammation extends to the sclerotic coat and iris, and even to the parts seated behind them. This occurs most frequently in prolonged or after repeated attacks; and occasionally is followed by structural change of these parts, or by dropsical enlargement of the globe.

73. *d*. *Diagnosis*. — The extreme intolerance of light, and copious flow of tears in connection with the trifling external redness, the pustular elevations of the conjunctiva, sufficiently distinguish this affection, which frequently, also, co-exists with enlargement of the glands and scrofulous irritation of the nostrils, lips, behind the ears, and in other parts of the body. In many instances, however, of conjunctivitis in children, it is difficult to draw a distinction between the common and scrofulous forms of the disease; the characters of the one gradually merging into those of the other. This is more especially the case when the affection of the eyes is associated with, or consequent upon, either acute or chronic cutaneous eruptions, particularly such as affect the scalp and face.

74. *e*. The *Prognosis* is *favourable*, if the cornea be not affected, or if superficial or slight opacity, owing to deposition between its laminæ, only be present. Mere vascularity of the cornea will disappear; but if it be attended by thickening and opacity, the change will be more or less permanent. If ulceration have taken place to considerable depth or extent in the cornea, and especially if it be accompanied with affection of the iris, or lesion of the sclerotic coat, vision will be more or less impaired.

75. *f*. *Treatment*. — *a*. Constitutional or internal means are most important in this complaint. After the bowels have been freely evacuated, a course of *tonics* should be prescribed, with *alteratives*, to promote and improve the various secretions. A full dose of *calomel* and *rhubarb*, and afterwards equal quantities of the compound infusions of gentian and senna, or the compound decoction of aloes, repeated according to circumstances, will be most serviceable. In some cases, an *emetic* will advantageously precede the purgatives. Having thereby evacuated morbid matters, and excited the secreting and excreting viscera, tonics, especially the *sulphate of quinine*, will be productive of the greatest benefit. During the course of tonics, the hydrargyrum cum creta should be given, on alternate nights, with the sub-carbonate of potash and rhubarb or jalap. If the skin be pale, or the child languid and etiolated, the *preparations of iron* — especially the tinctura ferri ammoniata, the vinum ferri, the ferrum tartarizatum — may be preferred. An electuary of carbonate of iron, confection of senna, and treacle, may occasionally be substituted — particularly on the day following that on which the powder was taken. In some instances, the decoction of *bark*, with *sulphuric acid*, may be alternated with these tonics, especially after mercurials have been laid aside. Cascarilla with soda, or any of the tonic infusions, with small doses of the *chlorate of potash*, may likewise be tried.

76. *β*. *Regimen* and *diet* are most important items in the treatment. The patient should be warmly clothed, and take regular exercise in the open air, particularly when it is dry and bracing. Change of air, occasionally to the sea-side; and *warm, tepid, or cold bathing*, are also beneficial. In weak or irritable children, warm or tepid bathing, salt having been added to the water, or in sea water, should be first adopted; and cold bathing tried, as the health improves. The *diet* should be duly regulated; animal food in moderate quantity, suitable vegetables, and ripe baked fruits, being allowed; but all fermented liquors, indigestible substances, and rich crusts or pastry ought to be withheld. The usual farinaceous food should always constitute a chief part of the diet. The child ought to wear through the day a dark shade before the eyes; and sleep in a dark but well-aired room, with the head considerably raised.

77. *γ. Local Treatment.*—When the external inflammation is considerable, or approaches the characters of common ophthalmia, and is attended by symptomatic disturbance of the system, *local bleedings*, and the rest of the antiphlogistic regimen, should be prescribed, particularly at an early stage of the complaint. The intolerance of light is no indication of the propriety of local depletion; for it is generally aggravated by the practice, and relieved by tonics and a light and nutritious diet. Mr. Mackenzie advises, particularly in chronic cases, and in the seat of the vascular fasciculi, *scarifications* of the eyes and lids. *Fomentations* with warm water, or a warm decoction of poppies and camomile flowers, are of service. Applications as warm as they can be borne are more beneficial than those that are cold, which are not suited to scrofulous persons. The steam of warm water to which camphor and opium have been added, is also useful; or a few drops of an opiate may be allowed to run between the lids. After the painfully acute symptoms have been removed, and the bowels freely evacuated, a solution of from two to six grains of lunar caustic in an ounce of water, dropped between the lids, is very serviceable in diminishing the irritability of the organ, and in healing slight ulcers. A stronger solution may be applied by a pencil to the ulcerated part, and the red precipitate ointment to the lids at night. In older children, *blisters* behind the ears or on the nucha are serviceable; but they ought to be removed after five or six hours. If thickening and opacity of the cornea be going on, the free administration of calomel or hydrarg. cum creta, either alone or with *James's* or *Dover's powder*, is advised by Mr. Lawrence, until the mouth is affected. When incrustations form in the vicinity of the organ, tepid ablution, and the mild ointments, at first alone, and afterwards with the oxyde of zinc, when the state of the complaint and of the system, or the previous treatment, will admit of drying them up, should be employed. — In cases attended by ulceration of the cornea, it will often be necessary to touch the part, every second or third day, with lunar caustic, as directed by Scarpa. The application of *belladonna* to the eye or its vicinity, to cause dilatation of the pupil, will occasionally be serviceable in preventing either adhesion or prolapse of the iris. — *Relapses* should be guarded against by a careful examination of the eye from time to time, by attention to the digestive organs, and by an invigorating regimen.

78. F. Exanthematous Ophthalmia. Syn.— *Exanthematous Conjunctivitis — Inflammation of the Conjunctiva occurring during Exanthematous Fevers.* — Inflammation of the conjunctiva is frequently observed in the *course of*, or *consequent upon* —(*a*) *Small-pox;* (*b*) *Measles;* (*c*) *Scarlatina;* and (*d*) *Erysipelas.* — As to each of these associations, and the treatment most appropriate to it, I proceed to offer a few observations.

79. *a. Variolous Ophthalmia — Conjunctivitis Variolosa.* — *α. Small-pox* causes inflammation of the *lids*, of the lachrymal sac, and of the *eye*, during the active stages of the eruption; and it gives rise to inflammation of the eye, and of the conjunctiva of the lids, and of the nasal duct, after the eruption has subsided. When variolous pustules form *only* on the external surface of the *eyelids*, or the ciliary margins, the affection is comparatively mild. In confluent or severe cases of small-pox, the *lids* are much swollen and closed, and the oozing of matter usually agglutinates them, and confines the secretions poured out in the conjunctiva. As the disease subsides, the lids are opened, and the eye appears to have been but little affected. They are, however, often somewhat injured. The pustules on the ciliary margins partially destroy the cilia, and render the margins uneven and liable to inflammation from slight causes.

80. *β.* When the inflammation extends to the globe during the *eruptive stage* of small-pox, constituting true or *primary variolous ophthalmia*, and occasioning pustules on the conjunctiva or cornea, the affection is very severe, and is often rapidly followed by suppuration or sloughing of the latter, and by the more serious consequences of these changes. As the eyes are closed, and cannot easily be examined, it is important to ascertain by symptoms the existence of inflammation of the globe. This is indicated by a sense of dryness, stiffness, or of sand in the eye, with pain in the ball, increased on moving it, aggravated by light although the lids are closed, and attended by augmented lachrymal discharge as the affection proceeds.

81. *γ.* A form of the disease may occur two, three, or four weeks after the desiccation of the small-pox pustules (*Secondary Variolous Ophthalmia*). It is generally more mild in this case; but one or more pustular elevations may form on the cornea, with redness of the sclerotic, lachrymation, pain, and intolerance of light. It does not terminate by sloughing; but suppuration and ulceration often supervene, leaving more or less opacity, or a permanent white cicatrix, limited to a small extent, as the surrounding haziness of the cornea is removed, vision being partially or completely restored. In scrofulous constitutions, it assumes the characters described above, and degenerates into the chronic form.

82. *δ. The Treatment of these forms* of affection must be conducted conformably with the principles already explained. When the pustules are confined to the *lids*, they may be touched, in an early stage, with the lunar caustic, in order to arrest their progress, as advised by M. Velpeau; or they may be opened, and the matter evacuated; the incrustations afterwards formed being removed by emollient applications and frequent tepid ablution. In the two other states, the danger to the organ is much greater, particularly in the *form attending the eruption.* But, as the affection of the eyes is most common in the confluent and adynamic states of small-pox, it cannot be advantageously combated by such free depletions as some surgical writers have advised. In many cases, local bloodletting and free purging may be of great service; but, when the constitutional powers are much depressed, no plan of ascertaining the state of the globe should be neglected, and a somewhat similar treatment of the pustules to that just advised should be practised as early as possible, to prevent their developement, and be followed by such astringent applications, alternated with soothing means, as the circumstances of the case may suggest. In the *secondary variolous ophthalmia, local depletions,* active *purgatives*, or even an *emetic*, resorted to at any

early stage, are more appropriate and beneficial. But the subsequent use of *astringents* will generally be required. In all the forms, *tonics* will afterwards be necessary; and the patient should be kept in a perfectly dark, but well-aired, apartment during the course of the disease.

83. *b. Morbillous Ophthalmia — Conjunctivitis morbillosa.* — Inflammation of the conjunctiva is a common attendant on *measles*. It is generally of a catarrhal kind, and may be either *primary* — preceding or accompanying the eruption; or *secondary* — remaining after, or following the disease at a short interval. Sometimes pustules form on the cornea, and pass into ulceration. There are generally much pain and intolerance of light in this variety; but it seldom assumes a severe, although often a chronic, character. The *Treatment* consists of *local depletion*, in the more acute cases; followed by active *purgatives, diaphoretics, blisters* behind the ears or on the nucha, *tepid washes*, and the protection of the organ from light.

84. *c. Scarlatinous Ophthalmia—Conjunctivitis Scarlatinosa.* — Inflammation of the conjunctiva may occur in the course of scarlet fever, in similar modes to those noticed in respect of the other exanthems; and although not so common in scarlet fever as in measles, it is sometimes more severe in the former than in the latter; ulceration occasionally supervening to a greater or less extent. This is, however, often the consequence of neglect. The *Treatment* is, in every respect, the same as that directed for the morbillous form.

85. *d. Erysipelatous Ophthalmia — Conjunctivitis Erysipelatosa.*—The inflammation of the conjunctiva attending erysipelas is preceded by redness and great swelling of the lids. In rarer instances, it follows upon an erysipelatous affection of the throat and posterior nares; and it is, in cases of severe affection of the face or scalp, often attended by much inflammation of, and effusion into, the cellular tissue surrounding the globe. It is most common in persons past middle age, or of a cachectic habit of body. The conjunctiva of the lids and ball is more or less injected; that of the latter often rises in soft yellowish red vesicles around the cornea, and occasionally it is affected in nearly a similar manner to the *pustular variety* already described. In some cases the redness partakes of a yellow tint, and in others of a livid or brownish hue. The eye has a watery appearance, and the cornea is often hazy from the fluid collected on its surface, but it is seldom otherwise affected. As the disease subsides, the copious lachrymation generally present is diminished, but the organ regains its natural state very slowly. The constitutional disturbance is very severe in this variety. (See ERYSIPELAS). The *Treatment* consists of local depletions, which, however, should be cautiously practised; of emetics, purgatives, blisters, diaphoretics; and of opening the vesicles that form, with the point of a lancet. In an advanced stage, tonics, and other remedies suited to particular cases, are requisite.

i. INFLAMMATION OF THE PROPER EXTERNAL TISSUES OF THE EYE. — *A.* COMMON INFLAMMATION OF THE EXTERNAL TUNICS. SYN. — *Ophthalmitis externa Idiopathica*, BEER; *Ophthalmia Sclerotica*, VETCH; *External Inflammation of the Globe*, LAWRENCE; *Catarrho-rheumatic Ophthalmia*, MACKENZIE, — *Phlegmonoid Sclerotitis.* — *a. Acute,* — *b. Subacute,—and c. Chronic.*

86. CHARACT.—*Redness of the external proper coats of the eye, with pain, intolerance of light, increased lachrymal discharge, and febrile disturbance.*

87. *a. Symptoms and Course.* — Simple or common inflammation of the eyes of persons otherwise healthy may originate in the conjunctiva or sclerotica; but, when severe in either, it generally extends to the other, and also to the cornea. It frequently also appears almost coëtaneously in both coats; and it presents every grade of severity. The external redness usually begins on the anterior part of the globe, forming a zone around the cornea, and arises from small vessels advancing from the posterior part of the sclerotica to the part adjoining the cornea. As the inflammation proceeds, the redness becomes uniformly diffused in the sclerotica, and is of a pink, rose red, or almost violet hue. In the more severe cases, the distended vessels are seen under the conjunctiva, occupying the whole surface of the sclerotica, and generally running in nearly straight lines from behind forwards. When the inflammation is seated in both this coat and the conjunctiva, the difference as to tint and situation between the vessels of each is very remarkable. The patient complains of stiffness and dryness of the eye, is intolerant of light, and feels a burning or aching pain, with a sense of tension, or pressure, or of dust in the eye (*Xerophthalmia*, or *Opht. Sicca*). The pain usually increases, and extends to the orbit and corresponding side of the head; the intolerance of light becomes greater; and the pupil is contracted. As the disease advances, the conjunctiva participates, its vessels are distended, and the cornea becomes dull, but not, at first, nebulous or opaque. In more violent cases, this membrane acquires a bright red colour, or even passes into a state of chemosis. At the same time pain and fever increase, the inflammation extends to the lids, and the cornea assumes a greyish hue. The dryness characterising the commencement of the complaint gives place to lachrymation, which is increased on opening the eye to the light, or moving it.

88. *b. The Effects* that present themselves, as the disease proceeds in an *acute form*, are observed chiefly in the cornea, and occasionally also in the iris.—The former becomes either vascular, and red or reddish brown, or greyish, and subsequently white, cloudy, and yellow, as if pus were infiltrated into its substance. It often afterwards *ulcerates;* the ulceration sometimes extending into the anterior chamber, and causing the usual consequences of this change. *Adhesion* also, of the iris to the cornea may occur either with or without ulceration of the latter, but always with more or less *opacity*. When the cornea presents only the first stage of change, is greyish, cloudy, or white, ulceration may be prevented, or arrested if it have begun, by suitable treatment; and, if it have not occurred, the cornea may regain its natural appearance.

89. *c. The sub-acute and chronic states* of the complaint are characterised by less severity, but longer duration, of the symptoms described above, particularly those depending upon the

affection of the sclerotica. They often follow the neglected or inactively treated acute disease. In these cases, the conjunctiva of the eyelids is somewhat irritated or inflamed. The eyes are painful on exertion, or exposure to much light; and the lachrymal discharge is thereby increased. In the more severe and protracted attacks, the transparency of the cornea and vision are more or less impaired. Although the chronic often thus supervenes upon the acute complaint, owing to neglect, to errors in diet, to indulgences in spirituous liquors, or to exertion of the organ, when the inflammation has been only partially subdued; yet, in persons of a cachectic habit of body, it may be the primary affection. In delicate or unsound constitutions, also, the complaint very frequently assumes a sub-acute or chronic form from the commencement, and continues long, until an increase of certain of the symptoms alarm the patient.

90. *d. Diagnosis.* — Inflammation of the external proper tunics of the eye is distinguished from that of the conjunctiva, by the redness commencing in the sclerotica, in the vicinity of the cornea, and extending backwards in the direction of the orbit, and only consecutively to the conjunctiva; inflammation of this membrane usually following an opposite course, and extending to the sclerotica only when it advances to the cornea. The discharge being lachrymal, and not mucous or purulent; the severity of the pain, and the intolerance of light; the situation and direction of the injected and enlarged vessels; the peculiar tint presented by the inflamed sclerotica; and the more frequent affection of the cornea; are circumstances sufficiently diagnostic of the complaint. The natural state of the pupil and iris, and the unimpaired vision, distinguish it from internal ophthalmia.

91. *e. The Prognosis* entirely depends upon the degree in which the cornea is affected.—As long as this part is unchanged, or if the lesion of it be but slight, a favourable opinion may be given. The case becomes serious, when the complaint occasions chemosis, and a greyish or whitish alteration of the cornea; and still more so, if matter be formed in it. In this case, ulceration will be inevitable; and the effect of ulceration or opacity upon the sight, will depend upon their extent and situation in reference to the pupil.

92. *f. Treatment.* — *a. In the acute form.* — *The predisposing and exciting causes* (§ 4, 5, 6.) to which the complaint may be referred, should be completely removed. The organ should next be protected from exertion, and from light and air. If one only be affected, the other should not be used, nor exposed to injurious influences. These measures, in slight cases, may be sufficient to cure the complaint; and have succeeded when further treatment could not be resorted to. But others should be employed, particularly in severe cases; and still more so in such as are violent, or are attended by affection of the cornea. Even in mild attacks, active treatment should not be withheld, as, even in these, neglect may be followed by serious results as respects the sight. *Bloodletting*, general or local, can rarely be dispensed with. The former ought always to be preferred when the complaint is attended by febrile disturbance, and should be carried sufficiently far to impress the circulation. It will be most advantageous if practised in the manner advised in the article BLOOD (§ 64.), and followed by the means there recommended (§ 65.). In milder cases, or in more delicate persons, or after venæsection, *local bleeding*, either by cupping on the nape of the neck, or behind the ears, or on the temples, may be directed; or leeches applied on the two latter situations. Mr. LAWRENCE advises them to be placed upon the lids, to the number of from twelve to twenty-four in the case of an adult. *Scarification* of the conjunctiva, is disapproved of by him, although recommended by some writers. WELLER advises it, when chemosis is present. In this form of ophthalmia, the modes of depletion now mentioned, are the most appropriate. *Cupping* in many cases may supersede venæsection; as a sufficient quantity of blood may be taken in this way, from either of the situations just named, for the exigencies of almost any case.

93. *Purgatives*, low diet, *refrigerants*, when the febrile excitement is considerable; and *diaphoretics*, are the next most important measures. *Calomel* and *James's powder*, either with or without *opium*, at bedtime; cathartics in the morning, and mild diaphoretics and diluents during the day; are generally appropriate. If vascular excitement continue notwithstanding, an antimonial *emetic* should be prescribed; or it may follow the depletion, and precede the exhibition of a full dose of calomel, and purgatives. In the more violent or protracted cases, *tartar emetic* may be given so as to keep up a continued nausea. When costiveness is present, or purgatives act insufficiently, drastic or terebinthinate *enemata* are requisite. If the free use of calomel, after the depletions, affect the mouth, the occurrence should be viewed as favourable; complete recovery being thereby accelerated, and the ill effects of the disease on the cornea prevented. *Colchicum* has been noticed in this complaint by several writers; and is serviceable either in the form of powder with calomel, or in aperient mixtures. It is most efficacious after the bowels have been fully evacuated. When the inflammation has been nearly removed by the preceding remedies, blisters on the nucha or behind the ears, and warm *pediluvia* at bedtime, are useful in preventing a relapse, or the passage of the complaint into a chronic state.

94. The *local means*, in addition to bleeding, consist chiefly of *cold*, *warm*, *emollient*, and *astringent* applications. The choice of these is a matter of some difficulty; but, when the disease is only commencing, or when the patient complains of great heat or burning in the eye, and experiences relief from *cold epithems*, then any of the various modes of applying cold may be adopted. If, however, the complaint be advanced, or if cold occasions an aching or chilling sensation, warm applications or *fomentations* should be preferred. It has been doubted by Mr. LAWRENCE and some other writers, whether such as are *emollient* and *narcotic* be at all superior to those which are more simple. The former have been recommended principally by Continental, the latter by British, physicians. The doubt has arisen chiefly from a physiological notion long entertained, although the grounds on which it is founded admit of a ready refutation. An intimate observation of phenomena — the only legitimate

experience — should alone decide the question. Although my experience in this matter has necessarily been limited of late years, yet have I seen enough even of this complaint, to convince me that fomentations with emollient and anodyne substances are superior to those which are simple — which consist only of warmth conjoined with humidity. Therefore, when the pain and intolerance of light are great, the disease somewhat advanced, or even established, warm emollient and anodyne applications ought to be preferred. Scarpa directs mallows boiled in fresh milk as a fomentation; or emollient and *anodyne vapours*, to be conveyed to the eye through an inverted funnel. Mr. Mackenzie directs *opiate frictions* of the forehead and temples, and the eye to be kept under the influence of *belladonna*. Fomentations with a decoction of poppy-heads and camomile flowers, or marsh-mallows; and the vapour of warm water, to which camphor and the watery extract of opium have been added; are generally beneficial in the circumstances just stated. Dr. Smith remarks, that when the pain was not alleviated by bloodletting or by fomentations, much and lasting relief was procured by exposing the eye, twice or thrice daily, to the steam arising from the following mixture brought to a boiling heat. It is now eighteen years since a nearly similar combination, but with much more opium and camphor than is here ordered, was prescribed by me with great relief, in a case of the disease.

No. 219. ℞ Mist. Camphoræ ℥ij.; Tinct. Opii ʒss.; Liq. Ammon. Acet. ℥ij.; Aq. Rosar. ℥iv. M.

95. *β. The sub-acute and chronic states*, especially the former, sometimes require either *venæsection*, or full *cupping*, particularly in young or robust persons. In most instances, *leeches* should be applied to the vicinity of the eye; and sometimes either they or cupping ought to be repeated oftener than once. *Purgatives* should be freely employed; and, if the tongue be loaded, and the evacuations offensive, an *emetic* should precede them. Great attention ought to be paid to the *diet;* and animal food must be taken only in small quantity, or nearly relinquished. *Counter-irritation* is generally beneficial; and either open blisters, pustulation by means of tartar emetic, setons, or issues, should be directed to the nape of the neck, behind the ears, or to the temples. During treatment, the bowels should be freely opened by stomachic purgatives, particularly if the tongue be loaded, and the discharges morbid; and the regimen as well as the diet rigorously restricted. If the above treatment have been actively employed, the complaint will be removed, without the necessity of resorting to *astringent* or *stimulating applications*. But, in neglected cases, they are sometimes very beneficial, especially if the affection of the conjunctiva be considerable, after the above measures have been appropriately prescribed, and when the complaint is far advanced, or in a chronic state. The *vinum opii*, dropped into the eye, was recommended by Mr. Ware; and is suited chiefly to chronic cases. The liquid laudanum of Sydenham (F. 729.), or preparations similar to it, may also be applied. The collyrium praised by Conradi, and which consists of one grain of corrosive sublimate dissolved in six ounces of rose water, with the addition of a drachm of mucilage of quince-seeds, and half a drachm or a drachm of Sydenham's laudanum, is often of service. Several other applications, some of them much more astringent than the above, have been recommended; but they are undeserving of particular notice. The astringent ointments and solutions, found so beneficial in the treatment of conjunctivitis (§ 16, 50.), may also be employed in the chronic states of this complaint, particularly under the circumstances just specified.

96. B. Rheumatic, Catarrho-Rheumatic, and Arthritic Ophthalmia. Syn. — *Opht. Rheumatica et Arthritica.—Sclerotitis Rheumatica et Arthritica.— Inflammation of the External proper Tunics in Rheumatic und Gouty Constitutions.*

97. *a.* The *Rheumatic* modification of ophthalmia — *Sclerotitis Rheumatica* or *Atmospherica* of Mackenzie — is seated in the external proper tunics of the eye, as in the common, or phlegmonoid, variety just described. The conjunctiva is only slightly affected; but the inflammation sometimes extends to the *iris*, or *cornea*, or to both, but generally in a slight degree. It is commonly *caused* by cold, or currents of air striking the eyes of persons of a rheumatic diathesis. It is not a common affection, and seldom arises from metastatis.

98. *b. Symptoms and Course.* — A stinging or tearing pain is complained of in the eye, increased by heat and by a warm bed, and extending to the orbit and adjoining parts of the head and face. The sclerotica is of a rose red, and shines through the conjunctiva, which is more injected than usual. There is an increased flow of tears, aggravated by changes of temperature. The pain subsequently becomes more dull and aching, extends with greater severity to the neighbouring parts, and lachrymation is augmented. The intolerance of light, which was only slight, is afterwards felt only in a strong light. Dullness or haziness of the cornea is frequently observed, but is seldom followed by any serious change. Sometimes *phlyctenulæ* appear in the conjunctiva oculi and cornea, but they do not often pass into ulceration. The biliary and intestinal functions are more or less disordered; and febrile disturbance is commonly present. The *severity* and *duration* of an attack vary very much. Slight cases soon subside; but severer attacks may give rise to *iritis*, which is, however, rarely acute, unless the disease be neglected, when it may go on to effusion of coagulable lymph. Rheumatic sclerotitis is not attended by affection of the lids, nor by chemosis; it does not give rise to suppuration, and rarely to ulceration, the ulcers being small or peculiar, and healing readily; and it sometimes lapses into a very chronic, slight, or recurring form.

99. *c.* The *Catarrho-rheumatic* ophthalmia of some writers does not differ materially from the common or phlegmonoid inflammation of the proper external tunics (§ 86.), being seated in the sclerotica and conjunctiva. It is usually *caused* by cold, and atmospheric changes; and, in the rheumatic diathesis, very nearly approaches, or merges into, the rheumatic form; the only difference being in the greater affection of the conjunctiva, and in the consequent manifestations of certain catarrhal symptoms.

100. *d. Arthritic Ophthalmia—Sclerotitis Arthritica.—Arthritic external Opht.*—or inflamma-

tion of the external proper coats occurring in the gouty habit, is oftener attended by *iritis,* than the rheumatic variety; but iritis is frequently observed in gouty persons without sclerotitis. Sometimes gouty inflammation of the sclerotica is accompanied with an *erysipelatous form of conjunctivitis,* which BEER has seen to follow the suppression of gout in the feet by cold. The *progress* of this modification of external ophthalmia, in its early course, is similar to the rheumatic, when it is confined chiefly to the sclerotica; but when the conjunctiva is also affected, it hardly differs from the *erysipelatous variety* already described (§ 85.). When the external proper tunics are the parts attacked by the gouty affection, pain of the eyeball is very acute, and darts in the course of the facial nerves, and is usually preceded by a pricking sensation. A flow of acrid tears takes place. The sclerotica around the cornea, becomes of a rose red colour, which is less vivid towards the circumference of the globe; and does not extend to the cornea, but leaves, immediately around it, as a pathognomic symptom, a narrow bluish white ring. The conjunctiva oculi soon partakes in the redness and increased vascularity, and is subsequently congested and varicose; the bright redness being changed to a dirty grey or violet colour. Arthritic ophthalmia runs a shorter or longer course; is milder in dry weather and in summer, than in wet weather and in winter; and is aggravated by, or accompanied with, derangements of the digestive organs. It is generally associated with iritis, but arthritic iritis may exist without the external proper tunics being materially affected. (See *Arthritic Iritis,* § 134.)

101. *e. The Prognosis* in *rheumatic ophthalmia* is favourable, unless phlyctenæ have formed and occasioned small ulcers; or iritis have supervened. But, in young or healthy persons these ulcers seldom leave permanent specks or cicatrices behind them. *Arthritic ophthalmia* is generally a more serious complaint than the rheumatic; and if it be attended with iritis, the association is much more dangerous to vision. It is also frequently accompanied with affection of the internal parts.

102. *f. Treatment.* — *a.* In *rheumatic ophthalmia,* general *bloodletting* is rarely necessary, but *local bleedings* are often serviceable. *Calomel* conjoined with *camphor, James's powder* and *opium,* at bedtime; and stomachic purgatives in the morning, assisted by *terebinthinate enemata;* are very beneficial in this variety. *Colchicum* is often of use, in conjunction with aperients and alkaline or magnesian carbonates: but it should not be given in the very large doses mentioned by some surgical writers. Its effects ought always to be carefully watched. After the bowels have been freely evacuated, the *spiritus colchici ammoniatus,* or a combination of the powder and camphor, should be preferred, particularly in delicate or aged persons. Warm applications and *fomentations* are most appropriate in this variety; and the steam of boiling water, containing camphor and tincture of opium, generally affords relief. *Diaphoretics* and warm *pediluvia* are also useful. If *iritis* has come on, *calomel,* in the combinations just stated, is especially indicated. If the mouth be affected by it, the good effects will be greater and more permanent.

103. Besides the above remedies, others may be employed in *chronic* or obstinate cases: as the compound decoction of guaiacum, or the decoction of bark with the ammoniated spirit of colchicum; quinine with or without the powder of colchicum; FOWLER's arsenical solution; PLUMMER's pill and aperients; antimony or ipecacuanha with camphor and opium; vinous or spirituous preparations of opium dropped into the eye; frictions in the vicinity of the eye with opium or belladonna, or with both, to alleviate pain and dilate the pupil; and counter-irritation by blisters or the tartar emetic ointment behind the ears or on the temples. If phlyctenulæ form, and run into small ulcers, *astringent* and *stimulating applications* will be necessary. In cases presenting much biliary or gastric disorder, an *emetic* will be useful; and, under any circumstances, change of air, regulated diet, attention to the biliary and intestinal functions, and the repose or moderate exercise of the organ, will be of essential service.

104. *β.* The *treatment of arthritic ophthalmia* does not materially differ from that recommended in the rheumatic form. Warm stomachic purgatives, with full doses of the alkaline carbonates, and the ammoniated spirit of colchicum; mustard pediluvia; blisters behind the ears; and dry warmth applied to the eye; and anodynes rubbed upon the temples and eyebrows; are more particularly indicated in this variety. If *iritis* supervene, the means directed hereafter in *Arthritic Iritis* must be resorted to.

105. C. INFLAMMATION OF THE CORNEA. SYN. —*Corneitis, Ceratitis,* JUENGKEN; *Keratitis,* ROSAS. — Corneitis may be either *acute* or *chronic, primary* or *consecutive.* Inflammation may commence in the cornea, and be confined to it, or extend to the sclerotica and conjunctiva, and sometimes to the iris; or it may begin in either of these tunics, and advance to the cornea. Corneitis often comes on, in this latter form, in most of the varieties of ophthalmia which have been considered; and presents either the *acute, sub-acute,* or *chronic* states, especially the latter. The *primary form* of corneitis, therefore, remains to be noticed. It is much less common than the consecutive; and is most frequently *caused,* epecially its *acute* or *severe states,* by external injuries, and by foreign bodies or acrid substance brought in contact with the cornea.

106. *a. Acute Corneitis* may be of various degrees of severity in different persons. In some, there is but little local uneasiness beyond irritation on motion; whilst, in others of a full habit, or who are laboriously occupied, exposed to heat, or addicted to intoxicating liquors, the inflammation is most intense, and rapidly extends to the sclerotica and whole anterior chamber, with *hypopyon.* The more severe states usually commence with a pink zone in the sclerotica, around the cornea; which loses its transparency, and becomes minutely injected with delicate-coloured vessels, particularly at its circumference, and dull, turbid, or cloudy. If the inflammation be excited by a foreign body, ulceration takes place around it. If the disease be not soon arrested, the pink zone assumes a deeper tint, and extends further in the sclerotica; the cornea is rendered more opaque, and suppurates; and the chambers of the aqueous humour are involved. When the

cornea is penetrated either by ulceration or suppuration, the aqueous humour escapes, the iris and cornea coming in contact. When the wound in the cornea is small, it unites by adhesion, and the aqueous humour is soon reproduced; but, when it is large, prolapsus of the iris often results.

107. *b. Sub-acute and chronic Corneitis* are common in young persons of a fair complexion and delicate constitution. The cornea loses its transparency, presents a dull grey colour, or becomes hazy, nebulous, or nearly opaque; the opacity commencing at the circumference, and gradually but unequally extending. The nebulous and opaque spots are sometimes yellowish, as if matter were formed; and the surface loses its polish, and seems rough. The circumference of the cornea is minutely injected with a multitude of very fine vessels, which impart to it a reddish brown tint, and occasionally elevate it somewhat. The conjunctiva often retains its natural paleness, but the sclerotica is minutely injected, particularly around the cornea. As the brownish red tint of the circumference of the part increases, the opacity in its centre becomes greater, and vision more affected. There is generally much intolerance of light, notwithstanding the diminished transparency of the cornea, owing to affection of the sclerotica. A *partial form of corneitis*, which is generally of very long duration, is sometimes met with. Inflammation commences in one or two spots at the circumference of the cornea, with pain of the eye, and nebulosity; others being affected in succession. Redness is first observed in the sclerotica, in one or two points; and minute vessels extend from these into the cloudy spots in the cornea; more or less of which may become thus affected, or entirely opaque.

108. Although the severe and *acute* grades of corneitis often run into suppuration or ulceration, the slighter or more *chronic* states do not terminate in this manner, excepting in sub-acute cases, where partial or circumscribed points of suppuration may occur. The more severe grades are attended by much pain in the eye, temples, and forehead; with tension of the organ, white tongue, and febrile disturbance, particularly at an early stage; and they often pass into the slighter and chronic states; but the latter also occur primarily. Chronic corneitis presents much less febrile disorder than the acute, and often continues for several months, or remits. The inflammation sometimes extends to the iris, occasioning adhesion of its margin to the capsule of the lens.

109. *c. Scrofulous Corneitis — Corneitis scrofulosa.* — Inflammation of the cornea in scrofulous habits has been minutely described by Dr. FRORIEP and Mr. MACKENZIE; but its local characters do not differ from those of the sub-acute and chronic forms noticed above (§ 107, 108.), excepting that it is more obstinate, and more liable to return. It is sometimes unattended by redness of the sclerotica; and the pain is not considerable. It is most common about the period of puberty, and is occasionally connected with amenorrhœa in the female, and with swollen lymphatic glands. In the more obstinate cases, increased secretion of the aqueous humour, and consequent enlargement of the anterior chamber, occasionally supervene.

110. *d. Treatment.* — *α. Acute corneitis* requires active depletory and other antiphlogistic measures. *Cupping* behind the ears or on the temples is always necessary. *Purgatives*, and afterwards *calomel* with *James's powder*, and occasionally with *opium*, until the mouth is affected, are beneficial, especially if the iris be inflamed. In the more obstinate and *chronic* cases, cupping, or the application of a number of leeches to the vicinity of the eye, should be repeated oftener than once, and be followed by open *blisters*, *setons*, or issues. Mr. LAWRENCE advises issues to be inserted in the temples. *Astringent* and stimulating applications to remove the opacity are generally injurious. Warm *fomentations* are more serviceable, particularly with emollient and anodyne substances. *Emetics*, if the digestive organs be loaded; and *diaphoretics*, assisted by warm pediluvia, if the skin be dry, and fever present; are also useful. — *β*. The *scrofulous variety*, especially its more chronic states, is benefited most by sarsaparilla, sulphate of quinine, decoction of bark with liquor potassæ, the compound myrrh mixture, the hydriodate of potash, and by small doses of the oxymuriate of mercury in tincture of bark.—As this variety often continues many months, perseverance in the use of these means, and changes from the one to the other, a dry warm air, and change of air, with attention to the state of the digestive organs, and a carefully regulated diet, are most requisite.

III. INFLAMMATION OF THE INTERNAL PARTS OF THE EYE. SYN. — *Internal Ophthalmia, Ophthalmitis Interna*, Auct. var.

111. DEFIN. — *Inflammation of one or more of the internal tissues of the eye, occurring either primarily, or consecutively of external disease, and attended by impaired vision, and frequently by constitutional disorder.*

112. In diseases of the internal eye, *artificial dilatation of the pupil* is necessary both to the investigation of their nature and extent, and to their treatment. Mr. LAWRENCE has given a learned account of the agents by which dilatation may be accomplished. Various narcotic vegetables possess this power, but *belladonna* in the highest degree. The tincture, extract, decoction, infusion, or powder of this plant may be employed for this purpose, either internally, or dropped into the eye, or rubbed on the brow or temple. *Hyoscyamus* is the next powerful substance. An aqueous solution of the extracts of either may be rubbed or placed upon the eyelids or parts in the vicinity, and washed off after remaining for about an hour; or it may be dropped into the eye, when a speedy and certain effect is desired.

i. INFLAMMATION OF THE ANTERIOR CHAMBER. SYN. — *Inflammation of the Capsule of the Aqueous Humour*, WARDROP; *Aquo-Capsulitis*, MACKENZIE; *Kerato-iritis*, ROSAS; *Inflammation of the Anterior Chamber*, LAWRENCE.

113. CHARACT. — *Diffused muddiness, or mottled appearance of the cornea, dimness of vision, fulness and tension of the eye, dullness of the iris, slightly contracted pupil, headach, white tongue, and fever.*

114. Inflammation of the membrane of the aqueons humour is often *consequent* upon the varieties of ophthalmia already described; but it is also a *primary* disease, and is most common in this form among children. It cannot be considered, even when primary, to be confined to the anterior chamber, or to this membrane. The

posterior chamber, the cornea, and iris, evidently, are also affected more or less. External inflammation involving the cornea may extend to the anterior chamber and to the iris; or inflammation may commence in the latter, and spread over this cavity to the cornea, and either adhesion of the iris to the cornea, or hypopyon, be produced. Primary inflammation of this membrane presents the usual phenomena of inflamed serous surfaces; viz. effusion of albuminous or coagulating lymph, or of a serous fluid, and very rarely of pus; the first of these sometimes becoming organised into morbid adhesions.

115. *A. Symptoms.* — The anterior chamber is cloudy; the iris becomes dull and dark, its surface assumes a reddish brown tinge, the reddish tint being most evident in light eyes; and the pupil is somewhat contracted. The cornea loses its transparency, becomes nebulous or mottled, sometimes with an ulcer in its surface. There is but little external redness, excepting a pink zone around the cornea. An effusion of whitish or yellowish matter takes place in the anterior chamber; and the patient complains of pain and aching in the eye and forehead, of fulness or tightness in the organ, and of intolerance of light, especially early in the complaint; these symptoms subsiding at more advanced periods. Its progress in children is not rapid. Mr. WARDROP considers the opacity to be seated in the internal surface of the cornea; and that it arises from a number of round specks, which give a mottled appearance to this part, particularly in adults. He also believes the effusion into the chamber, which has been generally considered pus, to be albuminous, and similar to that which causes adhesions, but not coagulable.

116. *B. Hypopyon* — or the presence of a yellowish matter in the anterior chamber, resembling, and usually called, *pus*, and attending or consequent upon inflammation — accompanies the affection now under consideration. But it more frequently supervenes, in the advanced course of inflammation of the external coats, from the bursting of an abscess in the cornea. It may also occur from iritis, particularly if an abscess of this part burst into the anterior chamber. Inflammation, however, of the membrane of this chamber, is common to all these affections, in a consecutive or associated form. When matter is effused behind as well as before the iris, it constitutes *empyesis oculi*, or suppuration of the eye. Various forms and divisions of hypopyon have been devised by BEER, RICHTER, BENEDICT, and JUENGKEN; but they do not deserve notice, as they lead not to any practical result, and as this is not a peculiar disease, but the result of inflammatory action consecutively or primarily affecting the membrane of the chamber, and tissues surrounding it. Whether the matter in hypopyon be pus or an albuminous fluid, it seems to sink to the bottom of the aqueous humour; but, in some instances, it appears as if heaped up or in lumps; and, in this case, a minute admixture of blood sometimes is seen in it.

117. *C. Treatment.*—*a. Inflammation of the anterior chamber* is readily controlled by local *bleedings*, *purgatives*, and *calomel* with *James's powder*, given twice or thrice a day. Mr. WARDROP has strongly advised puncture of the cornea, to *evacuate the aqueous humour*, in this and some other affections attended by inflammation of the membrane secreting this humour, after suitable treatment has been employed; and MACGREGOR, MUELLER, LANGENBECK, and BENEDICT speak favourably of it, as a measure calculated to prevent rupture of the cornea in purulent ophthalmia. Mr. LAWRENCE, who takes a candid view of the matter, thus remarks: — "I have tried it in some instances, but with so little benefit that I have not been induced to persist in the practice; and I have been the less inclined to do so in severe inflammations, because the ordinary antiphlogistic treatment enables us to control them."

118. *b. Hypopyon*, being an attendant, rather than a termination, of inflammation beginning in or extending to the anterior chamber, requires the antiphlogistic treatment recommended in the acute forms of ophthalmia. The only question is, whether or not the cornea should be punctured to evacuate the matter collected behind it. Puncture or incision has been advised for this purpose by WARE, RICHTER, BENEDICT, LANGENBECK, and WARDROP. BEER at one time directed it, but afterwards reprobated it. Dr. MONTEATH and Mr. MACKENZIE recommend its performance in every case in which the chambers are completely filled; as they consider absorption in such not to be depended upon, and dread the bursting and destruction of the eye. SCARPA and LAWRENCE, on the contrary, prefer active antiphlogistic treatment; as they consider that the operation aggravates the inflammation, and that when the inflammation is removed by judicious and energetic means, the effusion will be rapidly absorbed. In this opinion I entirely concur.

ii. INFLAMMATION OF THE IRIS. SYN. — *Iritis*, SCHMIDT.

119. CHARACT. *Fine vessels running in radii to the edge of the cornea; dark discolouration of the iris; contraction, irregularity, and immobility of the pupil; effusion of coagulable lymph into the pupil and posterior chamber, occasionally also into the anterior, causing adhesions of the iris to the capsule of the lens, with dimness of sight, sometimes almost amounting to blindness, pain in the eye, and nocturnal pain about the orbit.*

120. This affection was not known until it was ably described by SCHMIDT of Vienna. It may be *consecutive* of the diseases already noticed; but it often occurs in a *primary form*, and then generally assumes more or less of the characters of adhesive inflammation, the danger occasioned by it to the organ arising chiefly from this circumstance; for, if neglected or injudiciously treated, the pupil may become completely and irremediably obliterated by effusion of coagulable lymph. Some degree of inflammation of the sclerotica, and of the anterior hemisphere of the crystalline capsule, often extending to the choroid and retina, generally accompanies this disease; but the iris is the focus of morbid action, and the situation of the chief lesions. The primary states of the complaint commence in the pupillary edge of the iris, spread to the rest of the iris, to the capsule of the lens, and, perhaps, to the choroid and retina. The attendant inflammation of the sclerotica may be sympathetic, or otherwise related to it. — *Iritis* has been divided into the *idiopathic*, or that occurring primarily in persons of a healthy constitution; and the *sympathetic*, or that affecting those of an

arthritic diathesis, or supervening in the course of syphilitic cachexia.

121. *Causes.* — *Primary Iritis* occurs most frequently in persons of an unsound constitution — the gouty, rheumatic, and cachectic; and hence it presents certain modifications hereafter to be noticed. It rarely occurs in young and healthy persons; although it may supervene, in them, upon the other varieties of ophthalmia. It is *excited* by the common causes of inflammation of this organ (§ 5.); especially by over exertion, and employment of sight on minute or bright objects; by external injuries or operations on the eye; and by exposure to cold, wet, and atmospheric vicissitudes. These last are the common exciting causes in persons imbued with the syphilitic cachexia, and in those of a rheumatic and gouty diathesis. I do not believe that the use of *mercury* will cause the complaint, if it be given so as to affect the mouth.

122. *A.* IDIOPATHIC IRITIS. — *a. Symptoms and Course.* — Iritis presents various *grades of severity*, and *periods of duration*. It may hence be *mild* or *severe*; *acute*, *sub-acute*, or *chronic*. I shall adopt Mr. MACKENZIE's division of iritis into *three grades.* — *α. In the first degree*, the vascularity of the sclerotica is barely perceptible, and exists only in one or more points, and chiefly behind the upper lid. The ring of the iris next the pupil is slightly discoloured; the pupil is not materially contracted, but is somewhat irregular, without its usual clean and sharp edge, and is hazy; and the motions of the iris are limited and slow. Vision is confused and slightly obscured. There is little or no pain, or aversion from light. This state of iritis may exist for many weeks, and yet be completely removed by suitable treatment.

123. *β.* The *second degree*, or that with evident external inflammation of the eye, is much more frequent than the foregoing. A zone of vascularity is observed in the sclerotica around the cornea, the vessels sinking through the sclerotica, and not advancing into the cornea. The iris, particularly its inner or smaller rings, is discoloured, either from injection of its vessels or the effusion of lymph; and its anterior surface, instead of being smooth and shining, appears dull, puckered, and swollen, especially near the pupillary opening, where it is retracted towards the lens. The pupil is contracted, irregular, motionless, and filled with coagulable lymph, which generally appears like half-boiled white of egg. Epiphora and intolerance of light are considerable, and vision becomes greatly impaired. The pain in the eye is constant, and attended by pain in the orbit and forehead, particularly at night; and by the usual symptoms of inflammatory fever.

124. *γ.* The *third degree* of iritis presents the following characters: — The eye externally is much more inflamed than in the foregoing grades; the redness of the conjunctiva being sometimes so great as to mask for a time the red zone of the sclerotica. Both the smaller and larger rings of the iris are discoloured; the anterior surface being swollen, puckered, and bolstered forwards so as to approach the cornea, excepting its pupillary edge, which is retracted towards the lens. Red vessels and spots of blood are sometimes seen on the iris, but more frequently in the lymph occupying the very contracted pupil. One or more minute elevations, of a yellowish colour, which are in some cases specks of effused lymph, in others small abscesses, appear on the surface of the iris; and pus discharged from these abscesses, with lymph, blood, and serum, sometimes occupy the anterior chamber. The cornea becomes hazy and turbid, and occasionally dotted with minute brownish spots. There are at first great intolerance of light and lachrymation; and subsequently vision is completely, and generally permanently, lost. Flashes of light in the eye are frequently perceived by the patient, indicating the extension of inflammation to the choroid and retina. The pain in the organ is constant, great, and sometimes excruciating; with pain in the orbit and eyebrow, increased at night. When attended with extreme pain, especially in syphilitic cases, very serious changes, even abscess of the anterior chamber, disorganisation of the vitreous humour, &c. frequently supervene. In these, the inflammation is extended more or less to the internal and external tissues of the eye, and general ophthalmitis is the result.

125. *δ.* The *discolouration of the iris* arises from vascular injection and effusion, and is of a yellowish or greenish tint, in light eyes; or of a reddish hue, in dark eyes: but it is very frequently dull, muddy, and dark; and the natural brilliancy and fibrous arrangement of this part are lost. The *effused lymph* is seen first at the pupillary edge, and afterwards on the lesser circle of the iris; causing a villous, rough, elevated, or irregular surface or outline of the part. The lymph may be in distinct masses of very various sizes on the anterior of the iris, or at its pupillary margin; and, in the most acute cases, it may fill the pupil or anterior chamber, or even the posterior chamber. The *colour* of the effused lymph is sometimes a light yellowish brown or ochrey; but a rusty hue is most common. It is occasionally of a light dirty yellowish tint, particularly when it is abundant, and fills the anterior chamber. In this case, or when a small abscess in the iris is discharged in this situation, a form of hypopyon is the result. The *pupil* is contracted, and becomes more and more so in the progress of the complaint. The effusion of lymph and adhesions render it also angular, irregular, and fixed at one or more points, and free in others. It loses its thin, sharp, and well-defined edge; and becomes dull and cloudy, or otherwise discoloured.

126. *ε. The acute states of iritis* are observed in persons of a full habit or robust constitution, after the action of powerful causes, especially if they continue to act, and the case have been neglected at the beginning; and in cachectic conditions of the frame. They are attended by the usual characters of severe vascular action; especially injection of the vessels, extreme contraction of the pupil, effusion of lymph, dullness of the cornea, external redness, loss of sight, violent pain in the eye, and severe headach, with watchfulness, restlessness, and febrile disturbance, terminating, in a few days, in disorganisation of the interior tissues, and in irreparable loss of vision. — *In chronic cases*, the origin of disease is almost imperceptible, and its progress slow. Little or no pain is felt, and the external

redness is very slight or unobserved. At last, lymph is effused, vision is impaired, and the complaint is brought under treatment.—*The sub-acute cases* are intermediate between these two extremes. The chronic form may also follow upon an inactive or partially successful treatment of the acute and sub-acute forms; but it usually presents itself in the *first grade;* the acute most commonly assuming the *third*, and the sub-acute the *second grades.*

127. *b. Consequences and Prognosis.* — *α. Change of texture and colour of the iris* follow inflammation which has been violent or of long duration. General adhesion of the iris to the cornea may occur, and lead to staphyloma; or the iris may become adherent both to the cornea and to the capsule of the lens, occasioning anterior flattening of the eye. This is, however, very rare. Dropsical enlargement of the anterior chamber, with closed pupil and staphyloma scleroticæ, may likewise supervene (LAWRENCE). — *β.* After acute or sub-acute attacks, *the pupillary margin often becomes adherent* to the capsule of the lens, either throughout, or in one or more points. When the inflammation has disappeared, the adhesion still continues, or is reduced to slender threads admitting of partial motion. In some cases, adhesions of the iris are detached, leaving black marks on the capsule, which are permanent. — *γ. An adventitious membrane* may form in the pupil, from organisation of the lymph effused on the surface of the capsule. Its opacity is greatest in the centre; and it may be connected with partial adhesion of the iris. In rarer instances, the adventitious substance is seen in one side of the pupil, and attached to the edge of the iris (*Atresia Iridis incompleta*). — *δ. Closure of the pupil* follows effusion into the posterior chamber, and the formation of an opaque adventitious substance to which the circumference of the pupil is fixed (*Atresia Iridis perfecta*). This adventitious membrane may extend over the anterior capsule, causing adhesion of the uvea to the lens, and enlargement of the anterior chamber. — *ε. Atrophy of the globe* may supervene upon copious effusion into both chambers, and deposition of lymph behind the iris in such quantity as to cause bulging of the sclerotica, or to escape through this membrane and raise the conjunctiva. In this case, the fluid is absorbed after the subsidence of the inflammation; but the internal parts of the ball are so altered that they waste and become flaccid, particularly after complete closure of the pupil. The vitreous humour may also be rendered fluid, and the eye soft, without shrinking in size; but this occurs only after acute syphilitic iritis. — *ζ. Impaired vision* may be the result of the extension of inflammation to the posterior tunics, although the disease has been arrested by appropriate treatment; and may follow the acute, sub-acute, or chronic states of the disease. The impaired vision may be caused solely by the lesions produced in these tunics, or by these and the changes in the pupil conjoined.

128. *c. The Prognosis.* — When the disease is recent, and appropriate treatment is adopted, effusion into the texture, or on the surface, of the iris, will be removed by absorption upon the subsidence of the inflammation. Hence we need not dread the result, if the changes be confined to the iris, although the effusion be copious. But when the complaint has continued some time, and is attended by increasing contraction of the pupil and effusion of lymph, with organisation of the latter into adhesions and adventitious membranes; or when the consequences described above (§ 127.) are present, or inflammation extends to the posterior parts of the globe and retina, or to the cornea with more or less opacity; the greatest danger to vision is to be apprehended. In most cases, a guarded prognosis should be given; for it is often difficult to determine how far the posterior tunics may be affected. Change of colour in the whole iris, with great contraction of the pupil, and an opaque substance in it; intense external redness, severe and deep-seated pain, extinction of sight, and flashes of light in the eye; large effusion behind the iris, and bulging of the sclerotica; and a protruded state of the iris, and adhesion of the pupil; are all hopeless states of the organ. If unfavourable changes have not appeared, recovery may take place, although the complaint has been of three or four weeks' duration, and sight is much impaired.

129. *d. The Diagnosis of iritis* cannot be difficult, if the history of the case be considered, and the state of the iris carefully examined. The affection most resembling iritis is inflammation of the capsule of the lens. Nebulous, contracted, and fixed pupil, discoloured iris, adhesions between the iris and capsule, are present in the latter, which, however, often supervenes in the course of iritis, and generally attends its most acute attacks; whilst, on the other hand, inflammation of the crystalline capsule is attended by some degree of iritis. The one is thus reciprocally conquent upon the other. — *Retinitis* resembles iritis chiefly in the great contraction of the pupil; but the former is more sudden, its progress more rapid, its attendant headach more violent, and vision more rapidly impaired, than in the latter.

130. *e. Treatment.*—The *indications of cure* are —1st, to subdue the inflammation; 2d, to prevent or arrest the effusion of lymph; 3d, to promote the absorption of what has been effused; and, 4th, to preserve the pupil entire. They are to be accomplished by bloodletting, mercurials, belladonna, &c. — *Bloodletting*, in acute and sub-acute cases; in young, robust, or plethoric persons; when the pain is severe, and febrile disturbance considerable; and the inflammation extending to the internal tunics; must be most promptly and actively practised. It will often be necessary to repeat it; and even to follow it by *cupping* on the nape of the neck, or behind the ears, or on the temples. In the circumstances now stated, local bleeding cannot be confided in alone. But, in chronic, sub-acute, or mild states, cupping will be preferable. *Leeches* may be employed; but they are, unless a great number be applied, much less efficient than cupping. Immediately after the first bleeding, a full dose of *calomel* and *James's powder*, with *opium*, should be given, and repeated at bedtime; and an active cathartic draught (F. 216.) in the morning, aided by a terebinthinate enema (F. 150, 151.). The specific effects of *mercury*, which are most effectual in fulfilling the second and third indications, will be hastened by its combination with an antimonial; and, if the bowels be acted upon daily by a draught containing equal parts of the spirits

of *turpentine* and *castor oil*, or a larger portion of the former, the specific operation of the calomel will not be prevented, or even delayed, but the beneficial effects on the disease will be insured.

131. *Belladonna* is of great benefit in every stage of the complaint, and should be applied as directed above (§ 112.), contemporaneously with the exhibition of mercury. Although the pupil be contracted, and effusion or even adhesion has taken place, the specific operation of the latter, and the effects of the former on the iris, will elongate or even entirely detach the adhesions, if they are soft or unorganised. In addition to these, *diaphoretics*, *diuretics*, and warm pediluvia are beneficial. The bowels ought to be kept freely open by the substances already noticed. *Turpentine* may be used for this purpose, or with the view of aiding the effects of calomel, or even as a substitute for it, as advised by Mr. CARMICHAEL, who prescribes it in drachm doses, three times a day, suspended in almond emulsion. *Blisters* are of doubtful efficacy; Mr. LAWRENCE decides against them.

132. *B.* SYMPATHETIC IRITIS. — *a. Syphilitic Iritis*, or inflammation of the iris occurring in persons tainted by the syphilitic poison, is, perhaps, the most common variety of this disease. It is a symptom of syphilis in its constitutional stage; and, although sometimes appearing alone, it is more frequently one of several secondary symptoms, especially ulcerations of the throat, eruptions, swellings of the periosteum, pains of the limbs, affection of the nose, &c. It occurs most frequently along with the earlier secondary affections, and sometimes appears before the primary disorder is cured (LAWRENCE). It rarely occurs as a symptom of syphilis in infants, although secondary syphilis is not infrequent in them. It may be either *acute* or *chronic*; it is often associated with inflammation of other internal tissues of the organ; and it is most commonly determined or excited by exposure to cold, exertion of the eye, or external injury.

133. *Diagnosis.* — The characters and progress of syphilitic iritis are nearly the same as those of the idiopathic form; yet there are certain points of difference, which are frequently observed in the local symptoms, deserving of notice. These are the tubercular disposition, and the reddish brown discolouration of the lymph effused on the iris; the angular form of the pupil, and its displacement towards the root of the nose; and the violent exacerbations of pain felt chiefly in the brow during the night, and in a slighter degree or not at all in the day. The first and second of these are, however, not constant; the last is always present. But the most certain diagnosis are, the concomitance of other syphilitic affections, and the history of the case. — Lymph is effused from the margin of the pupil in *arthritic iritis*, but not deposited in a distinct form, and the adhesions are generally white; and both in it, and in the idiopathic variety, the pupil commonly retains its circular figure and central position.

134. *b. Arthritic Iritis.*—Inflammation of the iris is frequent in the *gouty diathesis*, but less so in the *rheumatic*, unless as a consequence of rheumatic inflammation of the sclerotica (§ 97.) In the gouty, it occurs most commonly in the iris from the commencement, although often some other tissues of the organ are affected at the same time; but, in the rheumatic, it rarely begins in the iris. The *gouty modification* is generally *acute*, and very severe; the *rheumatic*, *sub-acute* or *chronic*, and more mild. — The *former* generally commences with pain of the eye, intolerance of light, lachrymation, and zonular redness of the sclerotica. Pains are felt in the orbit, brow, and forehead. The iris soon becomes dull and discoloured; the pupil contracted, and fixed at one or more points to the capsule of the lens. The reddish zone in the sclerotica is of a dull or nearly livid tint, and does not advance to the edge of the cornea, but leaves a narrow white ring between. After a violent attack, with impaired vision, the symptoms subside, and sight is restored, the iris being attached to the capsule by whitish adhesions. This form of iritis often returns again and again, the eyes recovering almost completely after repeated attacks. Mr. LAWRENCE met with a case in which the disease returned fourteen times; yet vision was not materially impaired, though adhesions in each eye connected the pupillary edge of the iris to the capsule. But frequently a fresh effusion attends on each attack, until the pupil is more and more contracted, and at last filled with opaque adventitious membrane; the texture of the iris, notwithstanding, generally remaining but little altered.

135. *c. Scrofulous Iritis.* — This variety is consecutive of strumous ophthalmia (§ 68.), the inflammation extending from the external tunics. It is commonly preceded and accompanied by changes in the cornea, preventing the lesions of the iris from being observed. Hence it often escapes detection until it has completed its course. It very rarely occurs as a primary affection. Mr. MACKENZIE adduces a case in which the attack seemed primary; but its history is not conclusive on this point.

136. *Treatment.*— *a.* The *syphilitic variety* requires *local bleedings* and *mercurials*, as advised for the idiopathic disease, and in similar combinations, until the symptoms and the constitutional malady, on which the local one is engrafted, are entirely removed. *Turpentine* may also be employed as an auxiliary, and to open the bowels, either as directed by Mr. CARMICHAEL, or as prescribed by myself (§ 130, 131.). *Opiate frictions* around the eye, and *belladonna*, are also of great service. *General bloodletting* is seldom well borne in this variety, unless in robust or plethoric persons; but full or repeated *cupping* is often necessary.

137. *b. Arthritic Iritis.*— The *rheumatic modification* requires the treatment recommended in rheumatic inflammation of the external tunics — especially *cupping*, *leeching*, *blistering*, *alteratives*, with *colchicum*; and, subsequently, *cinchona* or *quinine*, with full doses of *colchicum*, aided by counter-irritation. *Turpentine* is also beneficial in this variety; but it should be given so as to act moderately on the bowels. Mr. WALLACE advises *bark* to be given from the commencement, when this disease follows low fevers. — The *gouty modification* will be removed by a very similar treatment to that now stated. *Mercurials* given with any other intention than that of removing morbid secretions and excretions, are more injurious than beneficial. *Colchicum*,

in full doses, with the alkaline subcarbonates and warm purgatives, is especially indicated. *Blisters*, and derivatives to the lower extremities; *tepid fomentations* to the organ; frictions with opium and belladonna to the forehead; a free state of the bowels, and attention to diet; are particularly requisite. As the attacks are often repeated, measures of *prevention* should be adopted. The chief of these are, low living, a free state of the bowels and of all the excretions, the removal of plethora, and preserving the organ from cold or over-exertion. — Nothing can be added to what has been stated, both here and in a preceding section (§ 130, 131.), as to the treatment of the *scrofulous variety* of iritis.

iii. INFLAMMATION OF THE INTERNAL TUNICS.

SYN. — *Internal Ophthalmia; Ophthalmitis interna idiopathica*, BEER; *Ophthalmitis posterior totalis*, ROSAS.

138. DEFIN. — *Severe, deep-seated pain of the eye, with impaired vision, contracted pupil, a sense of aching, tension, and heat, without much external redness, but with symptomatic inflammatory fever.*

139. *A.* Inflammation may commence in the *retina*, or in the *choroid;* but it cannot remain long confined to either. It frequently extends from the *iris* to the latter, and to other internal parts. The disease probably begins most frequently in the retina, and may, therefore, be designated *retinitis* in its early stage. We are necessarily less acquainted with the phenomena attending it, than with those accompanying iritis. ROSAS considers that the whole retina is not equally affected, but chiefly the vicinity of the yellow spot. — The *Causes of retinitis* are sudden exposure to light; the action of a strong light, as looking at the sun or bright objects; the light and heat of a bright fire; exertion of the eyes, particularly when the rays of light are refracted; and the predisposing and exciting causes described above (§ 4—6.).

140. *a. Symptoms and Course of retinitis.* — The patient complains of pain and aching deep in the eye; of a sense of tension or of heat, aggravated by using the organ, by exposure to light, or by whatever determines the circulation to the head. The pain is often pulsating, and usually extends to the brow and head. The pupil is much contracted; vision is impaired, and hourly becomes more so. In severe cases, the pupil is nearly closed, and sight almost or altogether lost; and flashes or sparks of light are perceived in the eye. At this period there is little external redness, excepting in the sclerotica around the cornea; but there are thirst, white tongue, and fever. With the continuance of the disease, the sclerotic redness increases, and a bright zone is formed around the cornea; and the inflammation spreads inwards to the vitreous humour and to the capsule of the lens, and outwards to the choroid and iris. This last now loses its natural colour, becoming greenish and reddish; and it is pushed towards the cornea. Sight is lost, even before total closure of the pupil takes place. The disease now may be designated *Inflammation of the internal tunics generally*, or the *second stage* of retinitis. The redness of the sclerotic extends; the conjunctiva becomes injected; the pupil often obliterated from effusion of lymph; the cornea somewhat dull; and general ophthalmia supervenes. The pain of the eye is unequal, or pulsative; is attended by a sense of weight, sometimes of cold; and chills or rigors are felt. Suppuration now occurs, and matter is effused in front of the iris, particularly if the pupil is not entirely closed, constituting hypopyon; and blood is sometimes mixed with it. — Such is the course of the most acute and severe cases of internal ophthalmia commencing in the retina, when uncontrolled by treatment; and the *results* are — 1st, Insensibility of the retina, from change of structure — *Amaurosis;* — 2d, Contraction and partial obstruction of the pupil, with impaired function of the retina, and opaque capsule and lens; — 3d, Closed pupil, with the formation of an adventitious membrane; — 4th, Suppuration making its way externally, and leading to destruction of the eye, and collapse of the coats.

141. *b. Chronic Retinitis.* — A very much milder and more prolonged form of retinitis than the foregoing, is often observed in persons who greatly exert their eyes. It is characterised by sensibility to light; more or less weakness or obscurity of vision, especially beyond the distance at which the eye has usually been occupied; with gradual contraction of the pupil, immobility of the iris, and aching in the eyes and forehead. This slight grade of the disease is manifestly confined to the retina. There is but little increase of vascularity externally; excepting, in some cases, a narrow or partial zone in the sclerotica around the cornea. The complaint is aggravated by stimulants and a heating regimen; and benefited by opposite means. It often continues months, or even years, with occasional exacerbations; and either in great measure disappears; or becomes greatly aggravated, or assumes the above severe form.

142. *c. The Prognosis in retinitis* is favourable in the commencement, before the pupil is very much contracted, or vision greatly impaired; but it becomes less and less so in proportion to the duration of the complaint. If misunderstood at the commencement, neglected, or ill-treated, the organ is frequently endangered. If the pupil be much contracted, and sight lost; or if sight be quite gone before the closure of the pupil; blindness will be the result. — If the disease have gone on to general ophthalmitis, all that can be hoped is to preserve the form of the eye.

143. *d. Treatment.* — Copious general and local *bleeding*, the active exhibition of *mercurials* until the mouth is affected, the employment of *belladonna, cathartics*, low diet, and the rest of the antiphlogistic regimen, as directed for iritis, with complete rest of the eyes and of the body, and exclusion of light, are the most efficacious means of cure. Bloodletting, although early practised, will often fail, if *mercury* be not freely administered. *Turpentine* may be also given to aid its operation, and act upon the bowels. These measures will succeed only in the first stage, before the pupil is closed and sight is lost. Yet, if suppuration have not occurred, it is still requisite, in order to preserve the form of the eye. In the *slight and chronic form*, local depletion, active purging, low diet, attention to the digestive functions, and repose of the organ, are the chief remedies. Open *blisters* behind the ears, or the tartarised *antimonial ointment*, are also beneficial.

144. *B. Choroiditis* — *a. Inflammation of the choroid*, of the hyaloid membrane, of the capsule, &c.,

under the terms *Choroiditis, Hyaloiditis, Capsulitis,* and *Lentitis* — have been described by Juengken, Rosas, and Mackenzie. But admitting, from analogy, that inflammation may commence in, and be more or less confined to, either of these tissues, for a longer or shorter time, I question the possibility of their being often distinguished from *retinitis*, with which they must necessarily be in some degree associated. I must refer the reader to the observations of Mr. Mackenzie on *Choroiditis*. He believes that the choroid, although generally affected consecutively upon iritis, is sometimes *primarily* and separately inflamed. The inference is most probably correct; yet experience shows that such a state of disease can but rarely be recognised. He states that *choroiditis*, in its earliest stages, exists without any signs of disease of the iris, and without any effects upon the sclerotica and retina beyond those which must necessarily arise from the pressure of an inflamed and swollen membrane. The dark colour of the choroid shows through the sclerotica, which thus appears bluish or purplish, and distended. The part most discoloured protrudes, generally, on one side of the ball, and near the cornea; and is of a deep blue tint, with varicose vessels running over it (*Sclerotic Staphyloma*). Several such tumours may surround the cornea, or may protrude on the posterior hemisphere of the organ. A watery fluid is sometimes effused between the choroid and the retina during its progress; and redness is observed in parts of the sclerotica. Although the iris is not inflamed, it is always narrowed or drawn towards the portion of the choroid chiefly affected, causing displacement of the pupil. There are generally attendant, intolerance of light, pain, hemicrania, frequently partial opacity of the cornea, dimness of sight, proceeding to total blindness, and febrile disturbance, disorder of the digestive organs. The disease is most common in the scrofulous diathesis; in those who over-use their eyes, without taking sufficient exercise, and who expose them to too much heat and light.

145. *b. The Treatment* consists of copious *bloodletting*, active *cathartics, mercury* aided by *turpentine*, and *counter-irritation*, in the earlier stages; and, subsequently, the internal use of the preparations of *iodine*, or the precipitated carbonate of *iron;* or the ioduret of iron, and the sulphate of *quinine*.

146. C. *Arthritic Inflammation of the Internal Tunics — Ophthalmitis Arthritica*, Benedict and Rosas. — *a*. Arthritic iritis frequently is confined to the iris; but in gouty persons of very impaired constitution, inflammation is either extended to, or almost simultaneously appears in, the retina, the choroid, the lens and its capsule, and the vitreous humour; the sclerotica and cornea being secondarily affected. It usually attacks elderly persons, of a full habit, with bloated, red, purple, and veined faces; and it generally terminates in loss of sight, with dilated pupil and opaque lens or glaucoma. At first the patient complains of increased sensibility to light; of lachrymation; and of a severe burning or tearing pain deep in the globe, with a sensation as if the eye were too large for the orbit. A dull and livid redness is observed in the sclerotica; it increases towards the cornea, but is separated from this part by a narrow white ring. The conjunctiva afterwards becomes injected, and the cornea dull. The pain is now distracting, and extends to the orbit, face, and side of the head: the iris is dark, assumes a dirty appearance, is irregularly contracted and fixed, the pupil often having an oblong or oval figure, in the transverse direction. A greenish discolouration is observed deep in the eye, from lost transparency of the vitreous humour. The posterior tissues swell and push the lens forwards, wedging it into the dilated pupil, and squeezing it even against the cornea. The lens also turns green, yellowish green (*Glaucomatous Cataract*), or dull white. The congestion and swelling of the internal coats distend the sclerotica, or bulge it out in parts; the cornea becomes hazy; and the changes in the iris, pupil, and external tissues, impart to the organ a dead appearance. Luminous flashes are frequently perceived in the eye; but sight is either much impaired or altogether lost — sometimes suddenly — from the commencement. At this stage the symptoms frequently subside, the iris preserving its dull hue, the pupil being fixed and dilated, and sight totally lost. A varicose state of the vessels in the sclerotica sometimes remains; or a dull leaden appearance, with small projections or larger bulgings around the cornea, as in choroiditis (§ 144.).

147. This disease generally affects both eyes, either in succession, or at once. Its duration is various as well as its severity; and it often assumes a less violent form than that now described, especially when its early symptoms have been mitigated by treatment. In this case, sight is more gradually and slowly extinguished; the pain is less; and the external changes, particularly the bulgings of the sclerotica, are either less, or but slight. It is difficult to determine what tissue is primarily affected; but most probably the choroid, retina, and iris, are almost coëtaneously attacked. The early loss of sight indicates an early affection of the retina; and the equally early tension and pain show that congestion and swelling of the choroid is present from the first.

148. *b. The Prognosis* is extremely unfavourable. If the characteristic symptoms of this affection be present, and more especially if vision be lost, permanent extinction of sight will be the consequence.

149. *c. Treatment* has hitherto been found to have little influence on this disease. Nevertheless, bloodletting; warm purgatives, with full doses of colchicum and alkaline subcarbonates; revulsants to the lower extremities, or behind the ears, or to the nape of the neck; active doses of turpentine both by the mouth and in enemata, so as to act efficiently upon the bowels and vascular system; subsequently Plummer's pill and the decoction of guaiacum, with the ammoniated spirit of colchicum and liquor potassæ; and full doses of sulphate of quinine, or of cinchona with or without colchicum, &c.; should be fully tried.

150. D. *Inflammation of the internal tissues after fever* sometimes occurs. It has been described by Dr. Wallace and Dr. Jacob. Of forty cases which the former observed, there were only four who had the disease in the left eye, and only two who had it in both. It may occur very soon, or not for some months, after fever; and it presents *two stages;* in the *first* of which, amau-

rotic symptoms are alone present; in the *second*, those of inflammation are superadded. The period at which the former commences after fever, and its duration before redness comes on, are very uncertain. In some cases, dimness of sight and *muscæ volitantes* have been present from the earliest period of convalescence, yet the inflammatory stage has not supervened for weeks or months; and in other instances, the amaurotic symptoms have not appeared till months after the fever, and have been soon followed by the second stage. The inflammatory changes disappear before the amaurotic symptoms (WALLACE).

151. Dr. JACOB met with seventy or eighty cases of the disease in one year. It is most frequent among the poor, in young persons and in females; and attacks always only one eye. The affection of the retina having been present from a few days to several weeks, the transparent parts of the eye become more or less clouded or opaque; the circumference of the cornea presents an opaque whitish appearance or circle, resembling the arcus senilis. The anterior chamber seems clouded. The iris is always dull, and altered in colour; but tubercles of lymph or abscesses are not seen in it; and it often moves actively. The pupil is slightly irregular; yet it does not contract adhesions, or become closed. Hypopyon sometimes ensues. In the worst cases, the lens becomes partially opaque, and presents an opaline amber colour. When vision is permanently lost, it is generally owing to this change. Impairment or loss of vision is the earliest symptom; and there generally are intolerance of light, lachrymation, and a stinging or darting pain through the eye to the temple or nose. Sometimes the suffering is slight; but it is usually increased on exposure to strong light (JACOB).

152. *The Treatment* recommended by these two experienced writers is diametrically opposite. Dr. WALLACE found depletion and mercury insufficient for a cure: he therefore gave half a drachm, or a drachm, of bark in powder, three or four times a day; or the sulphate of quinine in two grain doses. Dr. REID also employed bark with success in this sequela of fever. Dr. JACOB, however, states, that bleeding locally or generally, purgatives and antimonials, blisters and opiate stupes, and mercurials with opium and belladonna, are the most efficacious means of cure. He adds, that the relief from mercury is so certain, that he has trusted to it almost exclusively, with the assistance of belladonna. He has generally found two grains of calomel, with a quarter of a grain of opium, or five grains of blue pill alone, three times a day, answer every purpose; tenderness of the gums coming on in eight or ten days. If the pain be severe, he combines hyoscyamus or belladonna with the dose taken at bedtime. He tried the sulphate of quinine in four cases for eight days; but finding no relief, he gave mercury, which effected a cure. The cases occurring after typhus fever, recorded by Mr. HEWSON, and which were similar to those described by Drs. WALLACE, REID, and JACOB, readily yielded to mercurial treatment.

IV. INFLAMMATION OF THE WHOLE EYE. SYN. — *Ophthalmitis Idiopathica,* BEER; *Ophthalmitis Universalis,* WELLER; *Inflammation of the Globe,* LAWRENCE; *Phlegmonoid Inflammation of the whole Ball.*

153. CHARACT. — *Severe deep-seated pain; increased internal redness and tumefaction; a sense of tension, and a feeling of the organ being too large for the orbit, and about to burst from it; early loss of sight, with discoloured iris, and contracted, immoveable pupil; swelling and immobility of the globe, with partial protrusion of it and the eyelids; and severe inflammatory fever.*

154. *A.* This severe disease has been well described by Mr. LAWRENCE. It consists of inflammation of the internal and external tissues, and is not of common occurrence. It is met with chiefly in very robust constitutions, and persons of a phlogistic diathesis and full habit of body. It is most frequent in the right eye, as is the case with ophthalmic inflammation generally. Mr. LAWRENCE states, that of 134 cases of ophthalmia commencing in one eye, 95 began in the right. General ophthalmitis is most commonly *caused* by severe injuries of the organ; by the explosion of gunpowder before the eye; by great heat and light striking upon it; and fragments of stone, iron, &c. propelled against it.

155. *a. Symptoms and Course.* — At the commencement, the characteristic injection of both the sclerotica and conjunctiva is evident; with a severe burning or throbbing pain, and a sense of bursting distension. The surface of the organ is stiff and dry; but copious lachrymation soon comes on, and is increased by exposure to light. The external redness increases; and the conjunctiva swells into a broad firm ring of chemosis around the cornea, which it partially overlaps. There are intolerance of light, dimness of vision, contracted pupil, impaired brilliancy of the iris, and acute sympathetic fever. This constitutes the *first stage* of the disease. — The motions of the globe and lids now become difficult and painful; and the pain more and more violent, extending to the brow, cheek, temple, and head. The previously blue or grey iris assumes a dull greenish hue; and the brown or black, a reddish tint. The eyeball swells and loses its power of motion; the cornea grows muddy, and, by degrees, opaque; but vision is generally lost before these changes supervene. The patient perceives luminous flashes or sparks in his eye, owing to disordered action in the retina; and the vascular distension of the internal tissues generally occasions a sense of bursting. The deep-seated swelling and external chemosis partially evert the inflamed eyelids, which thus resemble, especially the inferior, a red fleshy mass; and both the ball and lids are protruded, and immoveable. The *second stage* is now fully developed. — Sympathetic inflammatory fever always accompanies this severe disease. The local symptoms are preceded, or attended at their commencement, by chills or rigors, followed by headach, white tongue, thirst, hot and dry skin; and accelerated, hard, and full pulse. These are increased at night, and accompanied with watchfulness, and throbbing in the temple and eye.

156. *b. The Consequences*, or the *second stage*, according to WELLER, are suppuration and opacity of the cornea, &c. If the disease be not arrested, the pain becomes throbbing; delirium sometimes occurs at night; and chills or rigors

are felt, indicating impending suppuration. The cornea is first a dull white, and then yellow, and matter is formed. The throbbing and bursting pain continues, notwithstanding, for some days, until the cornea bursts externally, and gives exit to the matter; the coats of the eye collapsing, and the form or the organ being lost. When the progress of the disease has been checked by treatment, the cornea remains opaque, and the pupil is either closed or very much contracted, and the aperture filled by adventitious membrane; vision being either much impaired or entirely lost. Even when recovery takes place, with an open pupil and clear cornea, the retina has generally suffered so much as to cause some imperfection of vision (Lawrence).

157. *c. Diagnosis.*—This complaint is characterised by the simultaneous affection of both the internal and external tunics; and is distinguished from the *sympathetic* or *specific* inflammation above considered, by the following circumstances:—(*a*) Redness, pain, swelling, intolerance of light, lachrymal discharge, and impaired vision, are all equally and co-ordinately developed; but in the specific inflammations, one or other of these is always predominant over the rest, and accompanied by some peculiar local and constitutional affection. — (*b*) These symptoms commence at the same time in an equal degree, and continue very nearly so throughout; but in the other ophthalmiæ, this correspondence is remarked neither at their commencement nor during their progress. — (*c*) The course of the malady is regular and continued, and it always terminates in suppuration of the globe, if not arrested by treatment; whilst the others remit more or less, and only occasionally terminate in this manner. — (*d*) Phlegmonoid ophthalmitis is always attended by severe sympathetic fever; but the specific forms are generally without fever, even when most severe.

158. *d. Treatment.*—It is only in the *first stage* that we can expect to preserve the sight. In *the second stage*, this will rarely be accomplished. When vision is altogether lost in this period, the preservation of the form of the organ can only be hoped for. If symptoms of suppuration have appeared, the eye will be destroyed. In the first and second stages, the most active antiphlogistic measures, as directed in internal ophthalmia (§ 143.), must be practised: general blood-letting, cupping, leeches applied around the eye, and scarification of the protruded lids; with active cathartics; calomel and James's powder in full and repeated doses; turpentine given by the mouth, and in enemata with castor oil; and belladonna; constitute the chief remedies. If suppuration have occurred, the anterior chamber being full of matter, the evacuation of it by a free opening into the cornea, will give relief, and not increase the inevitable mischief.

159. *B. General Ophthalmitis consequent upon the absorption of purulent or morbid matters into the circulation*, may occur.—It has been noticed chiefly after phlebitis, by Mr. Arnott and Mr. Higgenbottam; and is most frequent in the puerperal state, as a consequence of uterine phlebitis. The local symptoms in the early stages are the same as in the idiopathic, but less violent, and more insidious and rapid, and always terminating in suppuration and sloughing of the cornea. The constitutional symptoms are very different, and are of a typhoid and adynamic type. All the cases that have hitherto been recorded, have terminated fatally.

160. *C. An Intermittent form of Ophthalmia* has been described by some writers, particularly Hoffmann, Curry (*Trans of Med. and Chirurg. Soc.* vol. iii. p. 348.), and Heuter (*Lancet*, No. 331. p. 473.); but I agree with Mr. Lawrence, in considering a truly intermitting form of inflammation of any of the tissues of this organ as not to have been made out. Exacerbations, relapses, or returns, of the disease, from persistence or recurrence of the causes, may have been mistaken for an intermittent form. Frequently recurring attacks of inflammation in some one or more of the tissues of the eye, especially of the conjunctiva, and in slight and chronic forms, are sometimes caused by the sympathetic irritation of inflamed or carious teeth. — Of this form of disease, which is not noticed by writers, I have seen two or three instances; the removal of the adjoining irritation curing that depending upon it.

161. I should now have proceeded to consider the *consecutive and malignant alterations of the tissues of the eye*; but these, in a practical point of view, fall mostly within the province of the surgeon, a strictly medical treatment having but little influence in removing them. The malignant diseases of this organ are the same as those observed in other viscera, and are considered under distinct and appropriate heads. The functional disorders are treated of in the articles Amaurosis, Palsy, and Sight.

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FAINTING.

Syn. — Λειποψυχια, Hippocrates. Αποψυχια, Galen. *Syncope* (from συγκοπτω, concido); *Deliquium Animi*; *Defectio Animæ*, Celsus. *Defaillance*, Fr. *Die Ohnmacht*, Germ. *Swooning*.

Classif. — 2. *Class*, 2. *Order* (*Cullen*). 4. *Class*, 4. *Order* (*M. Good*). I. Class, III. Order (*Author*).

1. Defin. — *Temporary depression of the animal and vital actions, with pallor, cold perspiration, remarkably weak pulse, or absence of pulse at the wrist; respiration and sensation also being nearly abolished for a short time.*

2. The terms used by Hippocrates and Galen are synonymous with *Syncope*, a word of modern use. *Leipothymia* has been considered by later writers, particularly Morgagni, Dr.

GOOD, and Dr. ASH, either as the same as syncope, or as signifying a lesser grade of this affection. The definition which SAUVAGES has given, of *leipothymia*, assigns it a specific difference from syncope, or the usual form of swooning or fainting. He states it to be — "Subitanea et brevis virium dejectio, superstite pulsûs vigore, et cognoscendi facultate." I have had several opportunities of observing attentively the whole progress of this affection; and I admit the accuracy of this definition, with the exception of the continuance of consciousness, which is generally somewhat impaired, although not altogether lost. The pulse is unaltered from the state in which it was before or after the seizure, or not materially influenced; and in some cases I have found it so strong as to prescribe depletion; but the respiratory actions are nearly abolished. Leipothymia is, therefore, an affection of the animal and respiratory functions, that of the heart not being impaired. The slight or imperfect seizures often observed to precede fully developed *epilepsy*, or to occur between, or usher in, the severe attacks, and described in that article (§ 41. 52.), are examples of the leipothymia of SAUVAGES.

3. *Fainting* and *Swooning* are grades of the same affection, the latter being a more complete and prolonged state of the former. *Fainting* may recur after very short or irregular periods — the *Syncope recurrens* of GOOD. It is then often followed by palpitations of the heart.—*Swooning* is much less prone to recur, but is sometimes followed by severe reaction. SAUVAGES has divided syncope into as many varieties as there are principal causes inducing it.—Dr. GOOD has adopted a somewhat similar division. As, however, it varies chiefly in degree, from whatever cause it proceeds, no further distinction, than that which I have just made, need be assigned to it.

4. I. DESCRIPTION, &c.— Fainting is commonly preceded by languor, a sense of sinking at the epigastrium, anxiety, confusion of intellects, obscuration of vision, cold partial sweats, giddiness and ringing in the ears, pallid countenance and quivering of the lips, and coldness of the extremities. These may continue for some time, constituting what is usually called faintness, and disappear; or they pass into full fainting or swooning more or less rapidly. It is seldom that fainting occurs without these precursors; but when it is fully developed, respiration almost ceases, and consciousness is nearly or altogether lost. The action of the heart, however, still continues, but feebly; and, although the pulse disappears from the wrist, as in full swooning, it may still be felt in the carotids; or the heart will be heard to beat on auscultation. In some instances, relaxation of the sphincters, and discharge of the excretions, are said to have occurred. But this is rare in swooning, although it sometimes supervenes in leipothymia, in which the brain is rather oppressed with blood, than deprived of it; and in which the pulse retains its vigour. Sickness, or even vomiting, sometimes follows faintness, or accompanies recovery from fainting.

5. The sensations ushering in syncope are generally more or less distressing to the patient, and are sometimes described as accompanied by a feeling of death. MONTAIGNE (*Essais*, liv. ii. cap. vi.) found them rather pleasurable than otherwise; and therefore infers, that those attending upon dissolution must be similar. CHAMBERET experienced the like feelings. The *duration* of the seizure varies from a few seconds to one or two hours; but commonly from half a minute to ten or fifteen. It has extended in some instances to several hours. Much longer periods have been mentioned by writers; but their actual occurrence is questionable.

6. *The Consequences or Terminations* of syncope are — 1st, A return of the functions, respiration becoming more sensible and often suspirious, and eructations or vomiting occasionally supervening; — 2d, Palpitations of the heart, or general vascular reaction; — 3d, Hysterical symptoms, or a fully formed hysterical paroxysm; — 4th, Convulsions, general or partial, with or without consciousness; but they are much more frequently consequent upon leipothymia than upon true syncope; — 5th, Partial or slight paralysis, or prolonged vertigo; — 6th, In cases connected with passive enlargement of the cavities of the heart, and attended by a very slow as well as a very weak pulse, coagulation of the fibrinous portion of the blood has taken place in these cavities, and after some time occasioned death; — 7th, Dissolution has occurred in extreme cases, owing either to the complete depression of cerebral and nervous power, and the consequent inaction of the heart; or to the asthenia and wasting of the parietes of this organ, in conjunction with nervous depression. The fifth and sixth of these are rare; instances, however, of the latter are adduced in the article HEART. The termination in dissolution is not so rare; and is chiefly observed in cases of great debility or exhaustion from extreme or protracted pain, or from parturition; and particularly when a sitting or erect posture has been suddenly assumed or too long retained in adynamic fevers, and after exhausting discharges or depletions. Some years since I saw swooning caused by strangulated femoral hernia, that passed into complete tetanus of many hours' duration.

7. II. CAUSES. — The causes of syncope are strictly *occasional*. I shall consider them with reference to their operation. — *a. The causes which act more immediately on the nervous system*, are chiefly various impressions made upon the organs of sense, and depressing moral emotions. The odour of various flowers, according to the idiosyncrasy, sometimes occasions it. FABRICIUS HILDANUS has seen it produced by the smell of vinegar; and MARCELLUS DONATUS, by soft music. The airs of their native land have induced it in persons subject to nostalgia. Various unpleasant sights, or objects of aversion, have caused it — as the sight of blood, of surgical operations, or of a corpse; also sudden terror, fear, anxiety, disappointment. The impression made by mephitic or infectious emanations upon the nerves of smell, frequently induce more or less of faintness. Concussions and injuries of the brain; blows upon the epigastrium; shocks of the whole frame; gyration, rotatory motions, and swinging; excessive or prolonged pain; pleasurable sensations carried to excess, particularly the sexual orgasm; the exhaustion consequent upon inordinate excitement, long fasting, and the abstraction of accustomed stimuli; likewise operate principally in this way.

8. *b. The causes which affect chiefly the vascular system*, are the advanced stages of diseases of the heart and pericardium, particularly passive dilatation of the cavities or softening of their parietes. In cases of this kind, a fatal termination often supervenes in the form of syncope, as remarked by BONET, LANCISI, SENAC, MORGAGNI, MECKEL, and others. The most common of this class of causes is the loss of blood, particularly from arteries, whilst in a standing or sitting posture. HOFFMANN met with an instance of syncope from bloodletting proving fatal, and numerous similar cases are on record. During the period preceding the stage of excitement in fevers, syncope may follow the loss of an ounce or two of blood; and yet the same patient may bear, a few hours afterwards, when reaction has become developed, the loss of two or three pounds without this effect being produced. Excessive discharges and evacuations occasion it, by diminishing the circulating current, by deriving from the brain, and by exhausting nervous and vital power. Various circumstances retarding or preventing the return of blood to the right side of the heart, will sometimes cause fainting. The sudden removal of prolonged pressure, as of dropsical effusions, and of the contents of the uterus in parturition, often occasions it; but whether the removal of pressure acts in this latter manner or not, or in favouring a sudden and overpowering reflux of blood to the heart, is difficult to determine. Something may also be owing to the consequent diminution of resistance to the heart's action, and change in the accustomed states of several viscera, and to the effects upon the abdominal ganglia. It is very doubtful, that the syncope, which sometimes occurs upon the removal of the ligature from the arm after bleeding, and upon stopping the evacuation, arises altogether from the loss of blood, as fainting often takes place in such circumstances, although no indications of its approach existed at the time when the flow was stopped. In this case at least, if not in others where pressure is removed from internal venous trunks, the suddenly increased return of blood overloads the right side of the heart, and overpowers its action for a time, until the load is removed either slowly, or more rapidly by restoring nervous energy. In this manner general or relative plethora may cause syncope, the moving power being insufficient for the body to be moved.

9. *c. There are certain causes of swooning which seem to act both upon the nervous system and upon the heart, or upon the latter through the medium of the organic system of nerves.* — These are — 1st. Agents from without that make their impression on the respiratory passages. Some of the first class of causes act also in this way; especially mephitic or infectious effluvia. Instances have occurred of persons having swooned upon exposure to the effluvium of pestilential diseases, and of death having soon afterwards taken place. Such an occurrence could not have arisen from the effect produced upon the brain solely, or even chiefly. Indeed, I believe that all agents which impress nerves of sensation, especially those of smell and taste, act more immediately and energetically upon the heart than is usually admitted. — 2d. Sudden and intense changes induced in various parts of the body may be sympathetically propagated to the brain and heart, or may coëtaneously affect them; as when syncope follows gangrene, or the passage of noxious matters into the circulation, or the ingestion of sedative or noxious matters, or supervenes upon affections of the stomach, or occurs after the invasion of fever, and before reaction comes on. In these cases, however, congestion of the large vessels and right side of the heart, owing to, and associated with, depressed power of the organic nervous system, is chiefly concerned in overpowering or weakening the heart's action, and lessening the supply of blood to the brain. — The increased function of remote organs, and the derivation of vital action from the brain or heart, or from both, as in impregnation and quickening in the female, and in various diseases of the abdominal organs, will sometimes induce fainting. The sudden transition from a recumbent to a sitting or an erect posture, in delicate or debilitated persons, is often followed by vertigo, quickly passing into swooning; and is obviously caused by the rapid return of blood from the head, and the diminished supply to this part, in conjunction with its sudden and overpowering reflux to the left side of the heart.

10. It is unnecessary to adduce every circumstance that occasionally causes fainting, as they may be referred to the above heads; and as there is scarcely an occurrence or external agent which will not, on some occasion or other, however rare, induce it, when acting energetically on susceptible constitutions. On many, however, of the occasions in which it has been said to occur by writers, leipothymia has been mistaken for, and confounded with, it. Thus HEBERDEN, in stating that epileptics are liable to faint upon wakening in the morning, has mistaken this state for leipothymia, which is common in the horizontal posture, sensation and respiration being nearly abolished, but the pulse retaining its fulness and strength; whereas syncope rarely comes on, and generally disappears in this posture. In epileptic patients, leipothymia often occurs both when falling asleep and on wakening; but syncope principally on suddenly assuming the erect posture.

11. There are some occasional causes, the operation of which is not easily explained, such as warm baths, heated rooms, and overcrowded assemblies; sitting with the back to the fire, particularly at a meal; and great rarefaction of the atmosphere. These, probably, act chiefly on persons whose circulating fluid is deficient in quantity, by deriving it from the heart and brain. They more frequently, however, occasion leipothymia and apoplexy or convulsions, especially in the plethoric.

12. The occasional exciting causes seldom act excepting on *susceptible or predisposed constitutions.* These are — the debilitated by scanty nourishment, by acute diseases and profuse discharges; persons whose circulating fluid is deficient in quantity; the delicately constituted, especially females; and peculiar idiosyncrasies. Those who possess much sensibility and little moral courage or force of character — who have been effeminately brought up, indulged in childhood and youth, and unaccustomed to the contrarieties of life — are very subject to syncope. Some females, especially the hysterical, weak,

and excessively indulged, are remarkably liable to faint from the slightest mental or corporeal cause; and there is reason to believe that the liability is increased by repetition or the habit of fainting.

13. *Pathological Inferences.* — 1. In syncope, the heart's action never, perhaps, entirely ceases until it terminates in death. — 2. In fainting from hæmorrhage, cerebral influence, especially the voluntary powers and volition, is abolished before the heart's action is reduced to its lowest state; but, unless the swoon be complete, sensibility and consciousness are not entirely suspended. — 3. The like obtains in fainting from moral emotions and impressions made upon the senses; cerebral influence is first diminished, and instantly afterwards the action of the heart is weakened, the weakened vascular action still further impairing cerebral power, until fainting is the result.— 4. Several causes, both external and internal, or pathological, particularly those already specified (§ 9.), seem to act coëtaneously and coordinately upon the brain and heart, through the medium of the organic system of nerves; whilst others of the same class of causes (§ 9.) seem to influence more immediately and especially the heart through the same channel. — 5. Certain causes may suddenly derive the circulating fluid to the external surface or other parts; and the sudden diminution of the quantity returned to the heart and propelled to the brain, may induce faintness or full syncope. — 6. The sudden reflux of blood to the right side of the heart, especially when it supervenes rapidly upon the states just specified, may occasion fainting, by overpowering the heart's action, and thereby diminishing the supply of blood to the brain. — 7. Fainting may arise from inflammation of the heart, or effusion into the pericardium. — 8. It may also occur from the imperfect action of the heart caused by deficient organic nervous power, particularly of the cardiac nerves, with or without dilatation of the cavities, and weakness or softness of the parietes of the organ. — 9. It may be occasioned by circumstances preventing the return of blood to the heart. — To either of these two last are to be imputed the fatal cases of syncope related by Mr. Chevalier and Mr. Worthington, in which the cavities of the heart were found empty and relaxed, and the large veins adjoining devoid of blood.

14. Indeed, *death* may supervene in any of the modes in which syncope is produced, especially when carried to the extreme. Thus I have seen, in two instances, a moderate dose of the acetate of morphine occasion loss of voluntary motion, and scarcely perceptible pulse and respiration — the characteristic phenomena of swooning. A larger quantity might have caused death; its operation —extended from the stomach to the heart and brain — being the same, but so great as to put an end to the functions of these parts. Other causes, inducing any one of the pathological states now assigned, may act, in favourable circumstances, and in highly predisposed persons, so energetically, as to terminate altogether the vital actions; predisposition or pre-existent states of the frame, such as have been mentioned, being often as influential in producing the result, as the more direct cause.

15. III. Diagnosis. — Syncope may be confounded with *apoplexy*, with the seizures to which the term *leipothymia* is strictly applicable, with *asphyxy*, with certain states of *hysteria*, and with *death*. — (*a*) The strong, laboured, or stertorous breathing; and the full, strong pulse; sufficiently distinguish *apoplexy* (see that article, § 66.) from fainting. — *b*. In *leipothymia*, volition and voluntary motion are abolished, and consciousness nearly or altogether: but the pulse either is not affected, or is even fuller than usual; and it is more frequently the first stage of, or followed by, epileptic and apoplectic seizures, than true syncope. Frequently, also, leipothymia is intimately associated with epilepsy, the former being either the earlier manifestations or the lesser grade of the latter. — *c*. In *asphyxy*, the actions and functions of respiration are the first to cease; the circulation of venous blood continuing for some time, until, owing to the privation of pure atmospheric air, the passage of blood through the lungs becomes obstructed, as first shown by Dr. Williams (*Edin. Med. and Surg. Journ.* Oct. 1823.), when total arrest of the pulmonary circulation, abolition of the cerebral and nervous functions, and, lastly, *cessation* of the heart's action (see Asphyxy, § 14. *et seq.*), are the consequences. Respiration and circulation are here quite at an end; and the countenance and general surface are reddish, livid, tumid, or bloated; whereas in *syncope* the face and surface are pale and collapsed, and the respiratory functions and circulation still continue, although in a low and occasionally almost imperceptible state. In the former, there is remarkable congestion of the lungs and head: in the latter, the brain is generally insufficiently supplied with blood; and the circulation of the lungs, although languid, is seldom obstructed, and never altogether arrested, unless a termination in death supervenes. — *d*. Various manifestations of *hysteria* either very closely resemble fainting, or are in some way or other associated with it. The more remarkable phenomena of hysteria may follow, or precede, fainting, — most frequently the former; but the loss of motion and sensation often partakes more of the characters of leipothymia, than of swooning, the pulse at the wrist being but little affected. Pain under the left breast, borborygmi, and a sense of suffocation, which commonly precede the hysterical form of syncope, sufficiently mark its nature; and even when these are not present, other signs soon manifest themselves, especially convulsions, weeping, laughing, &c. (See Hysteria.) — *e*. Syncope is rarely so profound as to be mistaken for *death*; but Portal and Chamberet, with some writers on medical jurisprudence, concur in thinking that it may be both so complete and prolonged as to endanger premature interment in countries where the last rite is early performed. Whether or not the action of the heart, which cannot be altogether abolished even in such cases, may be detected by the stethoscope, I am unable to state; but it surely cannot continue many minutes without detection upon a strict scrutiny, unless death have taken place. The state of the cornea, which is soon covered with a film, or deprived of its delicate transparency, and afterwards collapsed; the appearances of the thorax upon examination; the signs yielded by auscultation; the condition of the body in respect of flexibility, &c.; and the

temperature under the armpits, &c.; will generally decide the question even in the most doubtful cases. Placing a mirror before the face, or down beneath the nostrils, and observing whether the former be moistened, or the latter moved, have been long popular means of ascertaining the certainty of death, as happily shown by SHAKSPEARE (*Lear*, act v. sc. 3., and *Henry the Fourth*, act iv. sc. 3.)

16. IV. TREATMENT. — Syncope is frequently not only its own cure, but often the means of removing the cause which induced it. — When occasioned by hæmorrhage, the languid state of the circulation permits the formation of coagula, which plug the vessels and arrest further discharge; and the loss of the voluntary powers causes the patient to fall in the very position which, of itself, generally restores the use of his faculties, by facilitating the transmission of blood to the brain. The *indications* are — *a*. To remove the cause of the affection; and, *b*. To recover the patient in the seizure.

17. *A*. For obvious reasons, the second intention often may be the first required, particularly when called to him in the attack. The patient should be placed in the horizontal position, and removed to an open and moderately cool air; and fragrant and cold water — lavender water, Cologne water, or simplee water — may be sprinkled on the face, or rubbed on the palms of the hands, &c. In more profound cases, frictions of the limbs, epigastrium, &c. may be assiduously practised in a well-ventilated chamber; and the usual stimuli — æther, camphor, ammonia, &c. — given internally, in moderate or appropriate quantity, as soon as the patient can swallow. The recumbent posture should always be continued until recovery is complete.

18. When syncope supervenes upon *bloodletting*, the recumbent posture should constitute the whole means of restoration; for unless the operation has been very injudiciously resorted to, this will be sufficient for recovery. The use of stimuli in this case will only increase the consequent reaction, and often aggravate the disease for which the depletion was employed. For syncope from *diseases of the heart*, a moderate and discriminating use of stimulants is often necessary; but they may be injurious if it arise from inflammation of the heart or pericardium. When it is caused by *hæmorrhage*, stimulants are very frequently hurtful, as they interfere with the consequent changes in the vessels, preventing a return of the hæmorrhage; but extreme cases and circumstances occasionally arise, rendering the use of stimuli indispensable.

19. If syncope occur *after parturition*, either from exhaustion of nervous power, or from hæmorrhage, internal and external stimuli ought not to be delayed. Swooning from hæmorrhage in the puerperal state always demands immediate and appropriate treatment, as it arises not only from the loss of blood, but also from exhaustion and the sudden removal of an accustomed pressure affecting more or less all the abdominal and thoracic viscera — from the combination of the three most powerful occasional causes of the affection. Besides, syncope supervening after the recumbent posture is assumed, is never devoid of danger; and the imperfect contraction of the uterus so generally connected with the production of hæmorrhage, will not be remedied by the continuance of this state.

20. *Bloodletting* has been considered by some writers necessary to the cure of certain forms of syncope, especially by those who have confounded leipothymia with it, which is often benefited by depletions. ZACUTUS LUSITANUS relates a case in which he practised it largely; but the fainting was there evidently connected with disease of the heart, — bloodletting being often necessary in such circumstances, although requiring much discrimination, both as to its adoption, and to the mode and extent of employing it. In the actual state of syncope it can hardly be resorted to without risk. The practice in such cases must depend upon the inferred nature of the heart's disease. I was some years ago called by a neighbouring practitioner to a patient suffering from recurring syncope, vomiting of all ingesta, and severe pain in the epigastrium, with anxiety, &c. The disease was viewed as acute gastritis, and appropriate treatment adopted; it terminated, nevertheless, fatally in a few hours. On dissection, evidence of intense inflammation of the pericardium, particularly the part reflected over the heart, was found.

21. *When vomiting* supervenes during syncope, a speedy removal of the affection is the consequence, unless the syncope be, as in the preceding case, a sign of a most acute and dangerous disease, wherein bloodletting should be resorted to. When fainting arises from the quantity or quality of the ingesta, the exhibition of an emetic is generally beneficial.

22. The question has been proposed by BRAUSER, whether bloodletting should be persevered in or not, when it almost immediately causes syncope without any evident cause? Such cases are not infrequent in practice; and I have met with the occurrence even where venæsection appeared most requisite, and the patient by no means fearful of its performance. In a case of this kind which lately occurred to me, copious local depletion was substituted with great benefit; but in a still more recent case, the patient recovered by means of internal treatment, without bleeding in any way. The question, therefore, cannot be answered in a positive manner one way or the other; but where syncope takes place, bleeding is not required in the great majority of cases, and it may be injurious. At a time when bloodletting was viewed as the chief remedy in fever, and directed to be performed as early as possible in the disease, I had opportunities of seeing it practised in the cold stage, or previous to the developement of reaction, of both the remittent and continued types; but it almost instantly, or before two or three ounces of blood had been withdrawn, produced syncope of a profound and serious kind, and proved manifestly hurtful. The results would have been very different had the operation been deferred to the stage of reaction: and hence, although instant syncope, or even faintness, upon bloodletting, is an indication of its injurious tendency, if persevered in at the time; yet a consequent state of action, general or local, may arise in a very short time, in which it will be borne to a very great extent without this affection resulting, and will prove most beneficial.

23. *B. The removal of the causes* of the affection, when these are of a constitutional or structural kind, must be attempted after recovery from the seizure. If it depend upon Debility, the means advised in that article will be requisite; and in other circumstances, the treatment suitable to inferred pathological conditions should be practised, as pointed out in the places where such conditions are more especially and appropriately considered. — The *prevention* of a return of the affection will be most effectually secured by this procedure.

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FAUCES. See Throat — *Diseases of the.*

FAVUS and ACHOR. See Porrigo and Pustules.

FEIGNING DISEASE. — Classif. — Diagnosis — Symptomatology.

1. Disease may be — 1st, *Pretended* or *simulated*, the person being in a state of health; — 2dly, *Artificially excited*, disorder being actually produced; — 3dly, *Exaggerated* in the description and appearance given of it, the patient being indisposed; — and, 4thly, *Artificially and intentionally increased*, or aggravated during its course. In these *four modes*, disease may be said to be *feigned* or *simulated*.

2. The *objects* desired to be accomplished by those who undergo the inconvenience, suffering, and moral degradation of feigning disease, are — *a*. To escape from being levied into the public services; — *b*. To procure a discharge from the public service; — *c*. To obtain both a pension and a discharge; — *d*. To enjoy the ease and comfort bestowed on the sick, and to escape from hard work, or unpleasant employment, mental or corporeal; — *e*. To obtain objects of desire, or to procure compliance with wishes or caprices; — *f*. To avoid punishment; — *g*. To excite compassion or interest; — *h*. To deceive.

3. The *persons* who feign disease with one or more of these intentions are — *α*. Soldiers and sailors; the former being usually called *malingerers*, the latter *skulkers*; — *β*. Slaves and serfs; — *γ*. The lowest class of labourers, and mendicants; — *δ*. Members of benefit societies; — *ε*. Persons who have received accidental or intended injury, and desire to obtain increased compensation for it; — *ζ*. Prisoners for debt, or for civil or criminal offences; — *η*. Young persons of both sexes wishing to escape from the confinement of school and the labour of study, or longing for a return to their homes; — *ϑ*. The spoilt or indulged, who desire to excite interest, or to obtain a compliance with their desires; — *ι*. and lastly, Those who wish to accomplish objects of private or political ambition, or to gain particular ends. — Feigning disease has been resorted to with the last-mentioned view, very probably from the earliest times. Amnon the son of David, Ulysses, Solon, the elder Brutus, the Roman Cælius (" *Desit fingere Cœlius podagram.*" — Martial.), " Hotspur's father, old Northumberland," the Constable Bourbon, Pope Julius III., the Earl of Essex, and Raleigh, grace this class of *malingerers*.

4. Disease may be so artfully feigned in one or other of the modes just stated (§ 1.), as to require the utmost discrimination and ingenuity to detect the imposture. It is obvious, as Dr. Cheyne remarks, that the discovery of it will be most readily made by those who are the best physiologists and pathologists, and most accurately informed respecting the operation of medicinal agents. In doubtful cases, the practitioner should take into consideration the constitution, education, information, habits, and probable motives of the person; and examine more especially those symptoms which are counterfeited with the greatest difficulty, in respect not merely of their individual, but of their correlative, characters. The frequency and rhythm of the pulse, in connection with the temperature, colour, and humidity of the skin; the expression of the eye and face; and the fœtor, colour, and consistence of the excretions; should especially arrest attention. A morbid appearance may be communicated to the excretions, and to the tongue and mouth; but a morbid fœtor of the former, and various states of the latter, are counterfeited with great difficulty. The intelligent observer will infer much also from the manner of the simulator; from the consistency of the account given by him; and from the relation one symptom bears to another, in its seat, nature, or severity; and will be careful not to lead him to suspect that the reality of his ailments is for a moment doubted, until proofs of detection are complete. The circumstance of impostors always overacting their part, overloading their accounts with unnecessary details, complaining of their sufferings, and readily falling into the snare of enumerating incompatible symptoms when a leading question respecting them is put, should not be overlooked. They are seldom desirous of obtaining medical aid, or of submitting to the treatment directed; and, in every case, strict attention should be paid to the exhibition of the medicines ordered, which ought never to be left in the possession of a suspected person. In doubtful, and even in real, cases of feigning, painful or even severe measures should not be inflicted, as in most instances, and especially in the public services, the mind of the impostor is made up to endure even torture rather than *give in*.

5. The importance of this subject in private

practice is greater than is commonly imagined; as one or other mode of feigning is often resorted to in civil life, especially among indulged females, in order to obtain compliance with their wishes, or to excite interest, or for the pleasure of deceiving; and, in such cases, the practitioner may lower himself in the estimation of the person attempting to impose upon him, by not detecting the cheat. At the same time he should be careful not to treat a person as an impostor unless the evidence is complete; for he will thereby injure himself in practice, and, in the public services, endanger the lives of those whom he wrongfully accuses. During the late war, when many went into the public services but scantily stored with medical knowledge, instances were not uncommon of persons feigning disease with success; and of others being treated and punished as impostors, who were actually suffering the complaints they made. In proportion, however, to the general advancement in medical science, such occurrences will be more and more rare; and, in recent times, numerous aids have been furnished, in very able papers on the subject, to those who may stand in need of them. In the following account of feigning disease, an alphabetical arrangement is adopted; indeed, it is the only one which the subject admits of:—

6. Abdominal Tumours have been feigned by paddings worn in the dress; and by pushing the abdomen upwards in bed, or forwards when erect. Detection is easy in such cases, on examination of the naked person. When this is resisted, the inference is obvious.

7. Abortion is simulated by staining the linen and body with blood, procured either by puncture of a vein in one of the extremities, or from the lower animals. Detection is difficult. The state of the pulse, the appearance of the mammæ, and of the countenance, and an examination *per vaginam*, may lead to more or less suspicion, but furnish no proofs of its occurrence.

8. Abstinence, either total or partial, has been feigned in numerous instances. Many of the persons who have done so, have possessed the power of abstaining from food for a very long time; but deceit has been always practised, when total abstinence has been said to have been carried beyond a few days. — A woman was condemned for the murder of her husband in the 31st of Edward III. (*Med. & Phys. Journ.* vol. xxxi. p. 50.) She had the wisdom to fast in prison forty days, and was pardoned on account of her miraculous abstinence. Ann Moore, who gulled the British public for some years in this way, and who really possessed the power of fasting for an unusually long time — eight or nine days, or nearly the whole period that a person can live without food — is said to have made a fortune by the imposture. Very attentive watching and much trouble are required in the detection of it; and wherefore should they be undertaken?

9. Blindness — partial or total — is feigned chiefly by men in the public services, by mendicants, and by persons endeavouring to avoid conscription into the army or navy. *Amaurosis* is the common form assumed, but paralysis of the eyelids is also sometimes alleged. Amaurotic blindness, being characterised by a dilated and fixed pupil, may be detected by the absence of this sign, and by watching the patient without his knowledge. During the last wars, numerous French conscripts were exempted from service by simulating blindness, and using belladonna to dilate the pupil and render the iris inactive. When the simulator has had recourse to this means, even the reflected light of a mirror will not cause the contraction of the pupil.

10. Cachexia Africana was formerly produced by the West Indian slaves, in numerous instances, by voluntarily adopting a practice usually caused by disease. It is often connected with disorder of the stomach at its commencement; and in this case the practice of dirt-eating only aggravates the primary affection, or changes it into the true African cachexy. Whether the practice be the result of a morbid appetite, or adopted with the intention of affecting the health, or causing death, it may be detected by the exhibition of emetics, and on the examination of the stools, the egesta being washed. The only means which succeeded in preventing it, when resorted to with suicidal intention, was to cause the slaves to believe that decapitation would be performed on them after death, as they imagine that this operation prevents their return to their native country, and their migration to other states of existence. — (Williamson, in the West Indies; and myself in Africa.)

11. Cancer is said by Mahon, Fodéré, and Beck, to have been feigned by mendicants and others. A part of the spleen of an animal is glued on the part, with the smooth side to the skin, leaving on the outside the appearance of an ulcerated or diseased surface. Pierre Pigray adduces an instance in which this mode of deception was attempted. His account leads to the inference that it was formerly practised on some occasions for the purpose of performing miraculous cures. Attentive examination of the part, and observing whether general signs of cachexia be present, are sufficient for detection.

12. Catalepsy is not infrequently simulated by soldiers or sailors, and by hysterical and capricious females. It may generally be detected, partly by considering the circumstances in which it is observed, and the kind of persons who are affected, and partly by artifice. The use of powerful stimulants; letting fall a drop or two of a very hot or very cold fluid on the skin of the patient's neck; proposing the actual cautery whilst the pulse is being felt, and marking the effect; and suspending to the hand which has been stretched out a small weight attached to a string, which should be imperceptibly snipped, and observing whether or no the arm be suddenly thrown up, are the usual means of detection. The last method was resorted to by John Hunter, in St. George's Hospital.

13. Concretions of various kinds have been pretended to be passed from the bowels, urinary organs, vagina, and stomach, by soldiers and females. Cases of this kind are adduced by Dr. Livingston (*Edin. Med. Comment.* vol. iv. p. 452.), Dr. Thomson (*Annals of Philos.* vol. iv. p. 76.), and Mr. Dunlop (Beck's *Med. Jurisprudence*, p. 7.). The most superficial examination, and the rudest chemical experiments, will show the difference between the substances thus used for deception, and the ascertained nature of the morbid concretions occasionally passed from the bowels and urinary organs. One of the writers

in the *Cyclopædia of Practical Medicine* mentions a remarkable instance of deception practised by a young woman at Edinburgh, and continued from 1817 to 1830. She feigned, during that time, hepatitis, epilepsy, amaurosis, aphonia, deafness, paralysis, gravel, anasarca, hæmatemesis, convulsions, gastralgia, dyspnœa, retention of urine, vomiting of substances resembling liver, bone, &c., and at last concluded by excreting bone from the vagina. Bone was first detected in the vagina in 1824, whilst introducing the catheter, and large quantities were passed, or extracted,—some even from the bladder. She was received into the hospital in 1825, and the bones which she passed were believed for a time to be those of an extra-uterine fœtus. She was there detected by cutting off the supply, and discharged. She afterwards had recourse to the same practice, but at last varied it, and had an illegitimate child in 1828.

14. Deafness and Deaf-Dumbness are simulated by those who wish to escape from the army or navy, or from criminal trials, and by mendicants. They generally lose their hearing suddenly; whereas real deafness is gradual, or the consequence of severe illness. The expression of the countenance and a change in the pulse often betray the impostor when something of great importance is said in his hearing. But some are prepared for this, and are even unmoved by very sudden noises. Mr. Dunlop states, that a soldier feigned deafness so well, that firing a pistol at his ear produced no effect; but on the experiment being tried after he had been put to sleep by opium, he started out of bed. Those who feign *dumbness*, are generally unaware that if a person has acquired the use of speech, he never can become dumb, however deaf he may be. The really dumb acquire an expression of countenance and gestures which are assumed with great difficulty; and few have sufficient art and perseverance to counterfeit deafness and dumbness, so as to avoid detection for any length of time. Some have attempted even to cause deafness, by introducing solid bodies into the ear, or by exciting inflammation of it by irritating matters. Honey and various other substances have been employed so as to simulate *otorrhœa*. The organ and the discharge from it should therefore be carefully examined.

15. Delivery has been pretended, with an obvious intention, after artificial abdominal enlargement and sudden subsidence of the tumefaction. In this case, the external parts of generation are moistened by procured blood, and the child of another substituted as the female's own. This cheat can be detected only by examining *per vaginam*. Soon after real delivery, the vagina will be relaxed, as well as the os uteri; the latter tumified and tender, and the lochial discharge flowing. But these signs will become less evident, the longer the time that has elapsed; and, after nine or ten days from parturition, they cannot be depended upon; but the well-known state of the integuments of the abdomen, and the appearance of the mammæ, will aid detection.

16. Dropsy has been simulated by French conscripts, who have been said to have actually injected water into the cavity of the peritoneum, and thereby produced factitious ascites.—Anasarca of the extremities has been caused by ligatures artfully concealed; but the imposture will be detected upon strict examination of the naked body, and by the absence of a leucophlegmatic or cachectic appearances. Cushions fitted to the abdomen, and padded clothes, are the modes resorted to by mendicants; but these require no remark. Instances are mentioned by Mangetus, Sauvages, and others, of *chronic dropsy of the head* being simulated by mendicants, who have daily blown air under the scalp of children through a small perforation at the vertex, until the scalp became enormously distended.

17. Dysentery and Chronic Diarrhœa are often feigned by soldiers and sailors, particularly in warm climates; and are sometimes actually produced by their using irritating substances for the purpose. Mr. Copland Hutchison has seen even a fatal result follow such practices. He ascertained that vinegar and burnt cork were often used to cause the disease. Suppositories of soap, and irritating substances introduced into the rectum, have also been employed to cause mucous discharges (Cheyne); but drastic purgatives are more frequently taken in sufficient quantity for this purpose. The dysenteric evacuation is simulated by breaking down the fæcal evacuation in the urine, and mixing with it the blood procured by pricking the gums. The imposture is detected by the cleanness of the linen; by obliging the patient to use a night-chair, and by watching his proceedings.

18. Emaciation—partial or general. *General emaciation* and *debility* are sometimes occasioned with the view of avoiding some disagreeable service, or to be sent home from foreign service, or to procure change of climate. Abstinence from food and sleep, the frequent use of purgatives or diaphoretics, especially antimony, and excess in spirituous liquors, are the means commonly resorted to. Wasting of a limb is caused chiefly by mendicants, by means of continued compression; and the diagnosis between artificial and real wasting is often very difficult. Detection must depend upon a strict examination, and a variety of considerations thereby furnished to the duly qualified examiner.

19. Epilepsy is very frequently feigned by mendicants, by sailors and soldiers, and occasionally by females to serve particular ends. In such cases it is proper to notice whether the person falls to the ground without regard to the situation or place; whether the face be livid, the pupil fixed, the spasm and convulsions general, the pulse altered, the insensibility complete, the mouth distorted and frothy; and whether sopor follow the fit, passing into heaviness, vertigo, and exhaustion, as all or most of these symptoms are absent, or imperfectly evinced in the simulated disease. The opportune appearance of, and selected situation for, the feigned paroxysm, the partial or successive production of the muscular actions, the sensibility of the iris, the abrupt termination of the seizure, and the absence of injury to the tongue, should also be taken into account. Foaming at the mouth is sometimes imitated by means of soap kept in it; but it is generally overdone in this case. The real epileptic is desirous of concealing his infirmity; whilst the simulator talks of his disease, and never endeavours to avoid publicity. It is chiefly, however, by artifice that feigned epilepsy can be fully

detected. De Haen, observing the sensibility of the pupil in a girl who feigned epilepsy to avoid work, suspected the imposture, and desired the attendants to place her in an erect posture, and to chastise her severely if she fell. She confessed the cheat. A beggar in Paris, who often fell into fits in the streets, was placed on a truss of straw, ostensibly to prevent him from sustaining injury. When in the midst of the paroxysm, fire was set to each corner of his bed, and he sprang up and fled. Sauvages was called to a female who imitated the fit remarkably. He inquired whether, on the access of the paroxysm, she felt pain extending from her arm to her shoulder, and thence to the opposite thigh. She said that she did, and was detected. Mr. Copland Hutchison introduced some Scotch snuff up the nostrils of a man whom he suspected of feigning a fit. It induced a fit of sneezing, and epilepsy was not afterwards heard of. Dropping alcohol into the eye (Cheyne), the introduction of nauseating substances into the mouth, proposing very painful or dangerous means of restoration in the patient's hearing, the dread of the actual cautery, directing boiling water to be poured over the legs, and actually pouring very cold water, have severally been recommended. Dr. Cheyne states, that in the case of a soldier, a table was placed upon another, and the simulator laid, in the midst of his fit, on the former. Dread of the fall terminated the convulsions. In doubtful cases, particularly in the public services, the medical man should be cautious in giving an opinion, and should never sanction punishment. Dr. Cheyne and other experienced writers state, that they are "in possession of sufficient evidence to prove that real epilepsy has often been considered feigned;" and they might have added — punished accordingly. But these occurrences, however frequent in past times, are not likely to take place often in future.

20. Fæces. — Incontinence of fæces is sometimes feigned. It is detected by examining the sphincter ani, according to the recommendation of Dr. Cheyne; who directs that, if it should contract upon the finger, opium and solid food should be prescribed, and a watch set over the person. If he pass solid fæces in bed, he will be a fit subject for punishment.

21. Fainting and Swooning are simulated by mendicants, by hysterical or indulged females, and by sailors and soldiers in order to escape punishment; but the nearly or entirely absent pulse, the scarcely perceptible respiration, the collapse, coldness, and paleness of the countenance, and cold sweats, with coldness of the extremities, are not easily produced at will. Ligatures or pressure have been used to suppress the pulse, and washes applied to the face to produce paleness; the means of detection should therefore have reference to such artifices.

22. Fever is more frequently produced artificially, than feigned. Ague is the type selected when feigning is attempted. The exertions, however, necessary to simulate the rigors of the cold stage will generally be found to be productive of the sweating stage instead of the former. Cantharides, and various stimulants, are usually taken to induce febrile symptoms; and a temporary acceleration of pulse is often occasioned by both sailors and soldiers, just before the physician's visit, by striking the elbow against any hard substance. Some persons acquire a power of accelerating the heart's action at will. Emetics are sometimes also resorted to, to make the deception more complete; and the tongue is artificially coloured by chalk, pipe-clay, brick-dust, tobacco, brown soap, &c. When suspicion is excited, the pulse should be examined a second time on leaving the patient, and preferably in the carotids or temples; the state of the excretions being particularly attended to. Cases of feigned fever are generally ephemeral, and a day or two of close examination generally leads to detection.

23. Gastric Affections, especially *gastralgia* and attacks of *vomiting*, are sometimes simulated. The former is detected with great difficulty, and chiefly from collateral circumstances. *Vomiting* is generally produced by having recourse to the common emetics, or to tobacco, particularly the latter, on account of its depressing influence on the nervous system and circulation; and by pressure on the stomach (C. Hutchison). I met with an instance, some years ago, where it was induced at will, by the action of the abdominal muscles, without even the aid of irritating the fauces. In such cases, the state of the appetite and the appearance of the evacuations should be examined; for, unless where tobacco has been taken to disorder the stomach, the former is but little impaired. In the case of vomiting at will just mentioned, the person had no sooner emptied his stomach, than he proceeded to replenish it again with an appetite. Not only is vomiting produced, but further deception sometimes is attempted by introducing various foreign substances into the matters ejected. A singular case, in which a girl was said to have brought up the larvæ of insects and reptiles from her stomach, is recorded in the *Transactions of the Dublin College of Physicians*. It afterwards, however, was ascertained to have been a well-managed deception.

24. Hæmorrhoids are sometimes simulated; the appearance of the hæmorrhoidal tumours being imitated by means of small bladders filled or tinged with blood, and partially introduced into the rectum (Percy and Laurent). Simple discharge of blood from the anus is more easily feigned; and the deception is detected with greater difficulty.

25. Hæmorrhages from the *Stomach*, or from the *Lungs*, are often feigned. In order to imitate *Hæmoptysis*, cough is pretended, and the saliva coloured by pricking, scratching, or sucking the gums; or by holding Armenian bole, brick-dust, vermilion, &c. in the mouth. An attentive examination of the sputum, and of the physical and rational symptoms, will generally lead to detection. *Hæmatemesis* is often feigned by swallowing bullock's blood, and soon afterwards by inducing vomiting. If the quantity taken be considerable, vomiting will often follow without any aid. Instances of deception practised in this way are mentioned by Sauvages, Metzger, and Beck. A close investigation of the symptoms, and, if suspicion be occasioned, a strict surveillance, will generally prevent a continuance of the imposture.

26. Heart-Affections have been simulated, in order to escape from the public services. MM. Percy and Laurent state, that a ligature has

been found so firmly bound around the neck, as to cause a livid and swollen countenance, and disorder the heart's action. Dr. Quarrier and Mr. Copland Hutchison ascertained, that white hellebore was often used by sailors to produce this effect; vomiting, purging, syncope, tremors, and nervousness, followed by palpitations, being the usual consequences of a large dose of this substance. Mr. Dunlop states, that death was occasioned in one instance by the use of hellebore with this intention.

27. Hepatic Disorders are often feigned by soldiers in warm countries, particularly in India; and by officers and others desirous of returning to Europe. If any doubt of the reality of the complaint exist, the person should be undressed, and carefully examined by percussion and the stethoscope. The absence of enlargement in the region of the liver, the complexion, and appearance of the surface and limbs, and the state of the pulse and respiration, are the circumstances which should chiefly be considered. It ought not, however, to be overlooked, that most serious disease of the liver may exist without enlargement; and this viscus may be considerably enlarged, and even rise up into the right thorax, without being felt below the ribs. Hence the propriety of having recourse to percussion and auscultation in the investigation, especially when other proofs of disease are wanting.

28. Hernia and Hydrocele have been simulated by blowing air into the cellular membrane of the scrotum. Mr. C. Hutchison met with an instance of hernia being feigned, by elevating the testes to the external abdominal rings. Detection in cases of this kind is quite easy.

29. Hysteria is not infrequently feigned. Dr. Dunglison directs sternutatories to be employed; but the affection may be real, although they produce their usual effect. Detection is by no means easy, especially when an intelligent female simulates this complaint. In a case to which I was lately called, the moral circumstances and the symptoms induced me to infer deception; and I accordingly took my leave, by simply stating, in the patient's hearing, that, if recovery was not complete in a few minutes, the affusion of cold spring water over the head and neck would certainly have the desired effect. It should, however, be recollected, that females who are really hysterical are the most prone to feign disease; this affection and the desire to simulate others frequently arising from the same cause, namely, uterine irritation.

30. Jaundice, notwithstanding the difficulty of the attempt, has been successfully simulated, particularly in France, during the late war. Conscripts employed an infusion of turmeric to tinge the skin, muriatic acid to give the evacuations a clay-colour, and rhubarb to heighten the colour of the urine. But the white of the eye cannot be changed by art, although smoke has been tried for this purpose. Washing the surface and preventing access to the materials of deception are the chief means of detection.

31. Insanity in some one of its various forms —but most frequently mania, melancholy, and idiocy—is frequently feigned; and detection is by no means easy. There can be no doubt that, in the public services, pretenders often gained their ends; and that the really afflicted were sometimes treated as impostors. Nor can this be a matter of surprise, when the great difficulty of discrimination is considered. In the present day, madness is most commonly feigned with the view of escaping from the punishment due to crime; and the responsibility of the medical examiner is consequently great. He should, therefore, have every facility afforded him, and take sufficient time to the investigation, that he may arrive at a correct conclusion. He should endeavour to obtain from the individual a full account of himself; mark its consistency, and place an intelligent watch over him. The expression of the countenance, and of the eye; the gestures and manner; the state of the tongue, the appetite, and the evacuations; and especially the duration, continuance, or frequency of sleep; ought to be carefully observed. Certain expressions of countenance and gestures are so peculiar to the insane, that the experienced observer will infer much from them. Pretenders generally overact their parts; assume the more violent or disgusting forms of mania; do not maintain the deception when they believe themselves unobserved; recommence it in the society of others; and possess not the power of prolonged abstinence from sleep and food so generally observed in the truly insane. Sound sleep soon overpowers the pretender, whereas the insane are remarkably watchful; sleeplessness to a distressing degree often preceding the disease, and always attending it throughout, for much longer periods than can ever be endured by a person in health.

32. The insane, during remissions, are desirous of being considered free from the malady, and often assiduously endeavour to conceal whatever may betray them; but simulators seldom carry their deception thus far. The real malady usually commences with slight disorder of the common modes of thinking and acting; and advances slowly through some hallucination, until at last it is either fully developed, or is suddenly exasperated. The feigned disease, on the contrary, presents not this course; is not preceded by sleepless or restless nights, and by a continued consideration of one topic; but appears at first in its full violence. The existence or non-existence of the causes of insanity, of previous attacks, of pre-existing eccentricity of manner or thought, of hereditary tendency, of antecedent affections of the brain, of injuries of the head, &c., the character of the individual, and the motives for feigning, will also be considered by the physician. Care should be taken not to infer deception, because the motives for it are apparently strong; for the circumstances constituting the motives may be the causes of the real malady. The costive state of the bowels; the large doses of medicine necessary to move them; the comparative insensibility of the stomach to tartarized antimony; the generally more frequent pulse, and the sudden and extreme irritation on any contradiction, observable in the maniacally insane; should not be overlooked, as they hardly admit of being feigned. Their disregard of the decencies, comforts, and affections of life, ought also to be taken into account; for, although these signs are often also simulated, deception in respect of them is seldom carried so far as in the real malady. A person even of pure character, when truly insane, will often use the grossest

language, practice the greatest indecencies and brutalities, and evince the bitterest dislike of, and malice to, his friends; but simulators exhibit those symptoms only when they believe themselves watched, or before others. Dr. Haslam remarks, that the *melancholic states* of insanity are feigned with greater difficulty than the maniacal; the one presiding principle, the ruling delusion, the unfounded aversions and causeless attachments, the peculiar look, the solemn dignity, and the associations characteristic of the former, can never be simulated so as to deceive the experienced observer. *Idiocy* is most easily feigned; yet there are always a hesitation and reflection observable in the discourse of the pretender; his disordered ideas not succeeding each other with the same rapidity as those of a person whose understanding has been really destroyed. The simulator will also, according to Dr. Marc, repeat the same ideas, and often the same words, in order to prove his madness, that he is requested to repeat, whereas the truly insane will wander incoherently from what he is desired to utter. In this form of insanity, the patient is always pusillanimous and submissive, unless during impetuous excesses, which only sometimes occur; and memory and conception are both defective.

33. It may sometimes be proper, if suspicion exists, to mention some severe remedy, or to threaten punishment. The really insane never heed these; but those who feign, will often discover by the change in the pulse, or by looks or actions, the emotions thereby induced. Zacchias states, that a physician ordered, in the hearing of a person whom he suspected of deception, that he should be severely whipped; inferring that the external irritation might be useful if the disease was real, or too severe a test if feigned. The threat was sufficient. Fodéré, on leaving a female who had long succeeded in simulating insanity, said to the keeper, within hearing of the patient, "To-morrow I shall again visit her; but if she continue to howl, if she be not dressed, and her chamber not put in order, you must apply a red hot iron to her neck." This was sufficient. The very treatment most conducive to the recovery of the really insane, is the most intolerable, if persisted in, to the simulator; who is often all at once cured upon hearing of his being about to be sent to an asylum, or of a continued and rigorous recourse to solitary confinement, low diet, and repeated counter-irritation.

34. Lameness is often feigned by sailors, soldiers, mendicants, and convicts, by pretending contractions of the muscles, deformity, the effects of fractures, and by introducing sharp bodies under the skin. For pretended *contractions* of muscles or joints, a tourniquet may be placed above the joint, and so closely drawn as to render the muscles incapable of acting, when the joint will become moveable. The emaciation of the limb in these cases is no proof of their reality, as it necessarily proceeds from disuse of the limb. — Previous *fractures* of bones is often alleged; but the cheat is readily detected on minute examination. — *Malformation*, particularly curvatures of the spine, elevation of one shoulder, inversion of the feet, and shortness or distortion of a limb, are sometimes simulated. There can be little difficulty in detection, on a careful examination of the naked body. Pretended distortion of a limb may be ascertained by the use of the tourniquet, or by straightening it, whilst the simulator's attention is withdrawn from it, as was done by Mr. C. Hutchison in a case which occurred to him. Instances have been met with of females who caused serious swellings and abscesses by introducing a number of needles into the parts.

35. Neuralgic, Rheumatic, and other Pains are very frequently simulated; and detection is very difficult, as it is next to impossible to prove the absence of pain. Inconsistencies in the patient's account of his case, and contradictions into which he may be readily led by an artful examination, are the chief means of detection. Pain is seldom very severe or prolonged, without being attended by certain symptoms, according to its situation. If it affect the joints, swelling, redness, stiffness, &c. are usually the result; if it occur in any part of the abdominal cavity, the functions of digestion, assimilation, or excretion will be disordered; if it affect the thoracic organs, circulation or respiration will be deranged; if it occur in the head, loss of sleep will, at least, be the consequence. The inference should depend much upon the kind of pain complained of, upon its continuance or recurrence, and the nature of the phenomena attending it. If violent pain is stated to be present, and the patient, notwithstanding, has a good appetite, sleeps well, and does not lose flesh, we may doubt its reality. The effects of remedies should also be taken into the account, as well as the patient's desire of, or objection to, those which are of a severe kind. But the most severe pains may long exist, even in external parts, without affecting their appearance; and be referred to internal organs, without materially deranging the functions. Several instances of this kind have come within my own observation. These have been usually called neuralgic; and have often disappeared for a time, either during treatment, or without the use of any means. Many of the reputed cures of these would have taken place without any remedy whatever; but, to whatever cause the recovery is attributable, the return of the pain in some form or degree is generally observed, although of this as little as possible is said by narrators of extraordinary cures; and sometimes a return of the complaint is the least unfavourable occurrence, — a more dangerous or even fatal malady taking its place, especially in the rheumatic and gouty diathesis.

36. Cases have occurred, which have caused suspicions of feigning, and yet the results have shown most serious internal disease. A female, some years since, consulted a number of physicians respecting a most violent pain in the left side and loins, extending upwards to the left mamma. One considered it neuralgic, another hysterical, a third uterine irritation; a fourth deception, probably connected with hysteria; and, lastly, it was attributed to spinal irritation. The appetite continued good, the urine appeared healthy, and there was no emaciation. After many years of suffering, the lady died; and there were found (what, indeed, might have been expected) a great number of calculi in the uriniferous ducts and pelvis of the left kidney. — A celebrated preacher and theological writer long complained in a similar manner. The urine was abundant, and of a good colour, and hence dis-

ease of the kidney was not suspected by the numerous eminent men whom he consulted; but this organ was, nevertheless, found after death, filled with calculi. I have met with two or three instances of the most severe pain, recurring at irregular intervals, in a particular joint — in the left shoulder joint in one case, and in the right knee in another — without any apparent local or constitutional disturbance; the tongue being clean, the bowels regular, the appetite good, and the flesh and strength undiminished. An ointment, with a large proportion of veratria, was employed for some time in one of these cases, without benefit. The most successful means in both, were such as improved the digestive and excreting functions. These cases, in circumstances admitting of the least suspicion, might have been considered as feigned.

37. I have no doubt that formerly, when the pathology of the spinal cord and its membranes was less attended to than now, many very severe affections, occasioned by changes in this quarter, were viewed as fictitious. — I lately attended an intelligent tradesman, advanced in life, who long complained of severe pains in the thorax, darting through both sides, and often backwards to between the shoulders. They were occasionally most violent, and fixed themselves for a time in one place, and then in another, of this cavity. The functions of circulation and excretion were unaffected, but the respiratory actions were sometimes disturbed. One day he was unable to get out of bed; and another he came down to his parlour. His complaints were considered chronic pleurisy, adhesions of the pleura, rheumatism of the thoracic muscles, &c. When first called to him, I examined the thorax by auscultation and percussion. The sounds furnished by both were perfectly healthy. The liver was thought to rise rather high; and the stools were deficient in bile. Chronic disease of the liver was, therefore, suspected. Upon extending the examination to the spine, two of the spinous processes of the upper dorsal vertebræ were found very prominent, and pressure in this situation caused great pain. The treatment was directed accordingly, and amendment took place. These cases evince the importance of a very minute and extended examination, in ascertaining the cause of pain, and, consequently, of proving its reality. When severe pain is complained of by females in any external or internal part, an opinion as to its reality or nature should not be given until the spine is carefully examined, and the state of the uterine functions inquired into. The existence or non-existence of tenderness, pain, or fulness in the hypogastric, iliac, and sacral regions, indicating disease of the uterus or ovaria, ought also to be ascertained; for if the least sign of disorder in any of these situations be detected, we ought not to infer deception, although it must be admitted that exaggeration, and even deception, may be practised nevertheless.

38. Ophthalmia was not infrequently produced by soldiers and conscripts during the last war, by means of corrosive sublimate, powdered alum, quicklime, acids, salt, tobacco, and various acrid powders and mechanical irritants. The extreme rapidity of the inflammation, especially as respects its invasion of the conjunctiva oculi and cornea, and the circumstance of the right eye only being affected, should excite suspicions. The chronic forms of ophthalmia were also excited and kept up by extracting the eyelashes and applying irritants to the edges of the eyelids. When entire seclusion of the suspected patient cannot be obtained, as in the navy, the recommendation of Mr. C. Hutchison to use the strait waistcoat should be adopted.

39. Palsy and Shaking Palsy are not often feigned. If, with the loss of motion, or the continued agitation of a limb or one half the body, the general health appears to be good, and the excretions natural, a watch should be set upon the patient, and his actions observed when he thinks himself unnoticed. The cold affusion, electric shocks, moxas, and the actual cautery, will often have a wonderful effect in suspicious cases. Even the threat of having recourse to these means has been sufficient. — In cases of simulated paralysis, detection may be easily accomplished by causing sleep by opium, and then tickling, irritating, or pinching the motionless extremity. If the disease be feigned, the limb will be retracted or withdrawn; and, upon first wakening, it will often be used before the patient recollects himself.

40. Polypus *of the Nose* has been often imitated, according to MM. Percy and Laurent, by French conscripts, who have succeeded by introducing the testes of cocks, or the kidneys of hares or rabbits, into the nostrils, and retaining them there by means of sponge to which they had been fastened.

41. Pregnancy is often pretended, to gratify the wishes of a husband or relations, to increase interest, to extort money from a paramour, to deprive a legal heir, to delay the execution of punishment, and to avoid labour. A careful examination of the areolæ of the mammæ, of the umbilicus, and of the *os uteri*, will generally lead to detection, at least in the more advanced months. (See Pregnancy.)

42. Pulmonary Diseases are not often feigned; but I have met with instances — two in females — in which slight symptoms have been exaggerated into the appearance of dangerous disease, particularly in the description of them, in order to accomplish particular ends. In such cases, the patient has a frequent and short respiration, and a hacking cough, with little or no expectoration; complains of the pain on coughing or taking a full inspiration, and of night sweats; evidently desires to be considered very ill, but is averse from medicine, as he considers it of no use; and even resorts to various means to produce emaciation, particularly vinegar, the oxides of copper, cream of tartar, tartaric acid, &c. The state of the pulse; the sounds produced by auscultation and percussion; the apparent despondency, instead of the continued and unwearied hopes of the patient, characterising the real disease; the marked reluctance to have recourse to issues, setons, or counter-irritants; and an enquiry into the wishes of the patient as to regimen, &c., are the chief means of detection. In private practice, the physician should endeavour to ascertain whether or no the treatment directed is strictly followed, particularly the insertion of issues, setons, &c.; for if these be not adopted after a confident recommendation of them, strong suspicions of deception should

be entertained, and he should immediately withdraw.

43. Rectum.—*Prolapsus and Fistula of the Rectum* have both been simulated by conscripts and persons desirous of escaping from the public services. Ambrose Paré, Percy, and Laurent met with instances, in which a portion of sheep's gut, or the urinary bladder, filled with blood, had been partially introduced up the rectum in order to imitate *prolapsus*. *Fistula* has been actually produced by making an incision near the verge of the anus, and introducing into it an acrid tent, particularly the root of white hellebore (Dunglison).

44. Rheumatism and Lumbago are often feigned by soldiers and sailors. Where they are complained of, without swelling of joints, or acceleration of pulse in the evening, or increased heat of the affected part, wasting of the limb, disorder of the digestive and biliary organs, or loss of the appetite and looks, suspicion should be excited. Dr. Cheyne remarks, that those who feign this disease, "give a glowing account of their sufferings, alleging that they have entirely lost the use of the part affected, which seldom happens in genuine rheumatism. There is, for the most part, no adequate cause assigned for the complaint; no relief from remedial treatment acknowledged; and, while real rheumatic affections are aggravated by damp, the impostor complains equally at all times." (See § 35.)

45. Sight.—Defects of this sense are frequently feigned. *Short-sight* may not only be pretended, but it may actually be occasioned by the use of concave glasses, in order to avoid military service. Those who are truly near-sighted, frown or knit their brows habitually, when looking at objects beyond the range of distinct vision, and the *crow-feet* wrinkles at the outer corners of their eyes become early marked. MM. Fodéré, Percy, and Laurent advise that persons claiming exemption on this account should be caused to read with concave glasses, the book being held at a proper distance, and without them, the book being put close to the eyes; if they cannot read distinctly in both cases, the imperfection is feigned. — *Night-blindness*, or intermittent blindness (hemeralopia, nyctalopia), is often simulated by sailors and soldiers serving in warm climates, where the affection is common; and it is detected with difficulty. The deception is practised in order to avoid night duty; and has been put a stop to by associating a blind man with one who can see, in the various works carried on during night, and when the sentries are doubled. (Cheyne.)

46. Somnolency, or Sopor, has been feigned with the utmost pertinacity, in order to obtain a discharge from the public services, or to answer purposes of revenge, as in the instances recorded by Dr. Hennen and Mr. Dease. As cases of sopor sometimes occur, care should be taken to distinguish between the real and simulated. The former is seldom, or perhaps never, unconnected with some cause of exhaustion operating chiefly on the nervous system, or without antecedent signs of mental and physical debility, particularly defect of memory, hesitation of speech, remarkable languor, &c. I lately attended, with Mr. Bushell, a gentleman about sixty years of age, who continued for many weeks in a state of sopor, interrupted only by being talked to loudly, or by taking food. When thus roused, he yawned, answered slowly, and instantly fell into a quiet sleep, unattended by any unnatural respiratory sound. He recovered slowly by the use of tonics and stimulants, and the occasional exhibition of stomachic purgatives. No cause but exhaustion of nervous and cerebral power could be assigned for the disease. Such cases, however, most frequently follow injuries of the head, attended by pressure on the brain, or the slow developement of tumours within the cranium. Dr. G. Smith mentions the case of a soldier who feigned a state of insensibility, and resisted every kind of treatment; but on proposing, in his hearing, to apply red-hot iron, his pulse rose, and amendment rapidly followed. A singular case of feigned sopor is detailed in the *Edinburgh Annual Register* (vol. iv. part ii. p. 159.). A soldier, 18 years of age, confined for desertion, lay, apparently insensible, from the end of April to the 8th of July, 1811. Electric shocks, the application of snuff to the nostrils, pins thrust under his finger-nails, and other stimulants, failed to rouse him. The sopor being thought the consequence of injury, the scalp was divided in order to ascertain the existence of depression, and the bone even scraped! yet no complaint was made. The case was viewed as hopeless, and the man dismissed. Two days after his discharge, he was seen cutting wood some miles from home. But wherefore should a depression of the cranium be hunted out by dividing and drawing back the scalp, and scraping the bone? One would expect that some tolerable signs of its existence should have presented themselves before such serious measures were resorted to. Can we be surprised at detection failing in such hands?

47. Tympanitic and Emphysematous Affections have been simulated, by introducing air into the digestive canal, and by inflating the cellular tissue, in the manner already stated (§ 28). MM. Percy and Laurent mention the case of a conscript who simulated an immense tympany by swallowing air; and Dr. Cheyne states, that this affection was apparently caused by a number of men in the 84th regiment. The pulse, tongue, and excretions were natural; but pain in the region of the liver, and over the abdomen, which was distended and tympanitic, with insatiable thirst, were complained of. Deception being suspected, they were required to take a cupful of a solution of the sulphate of soda in weak tobacco water, every four hours, until it operated. Recovery was speedily effected by means of this detestable medicine; but sixteen men had succeeded in procuring their discharge before this treatment was adopted. Dr. G. Smith states, that wonderful cures were often effected in military hospitals by a medicine composed of salts, aloes, and assafœtida, given frequently in small quantities, so as to keep the taste in the mouth. The substances used to produce this tympany seem not to have been fully ascertained. It was ascribed to the use of large quantities of chalk and vinegar.

48. Tumefied Leg is excited by means of an artfully concealed ligature, and keeping the extremity in a hanging posture. The writers on this subject in the *Cyclopædia of Practical Medi-*

cine state, that a case o enormous enlargement of the thigh and leg, resembling elephantiasis, was sent home from India to be discharged. A ligature was discovered, and, upon its removal, the swelling gradually subsided.—The detection and prevention of such cases cannot be difficult.

49. Ulcers artificially caused were remarkably frequent in both navy and army, during the last war. They were generally produced upon the legs, by various caustics or irritants, by friction with sand, by quicklime mixed with soap, by compression with metallic or other bodies, and by mineral acids. Arsenic, corrosive sublimate, tobacco, &c. have also been used for this purpose. Mr. C. Hutchison found a halfpenny between the muscles of a leg, which he removed in consequence of extensive caries of the tibia following artificially formed ulcers. Intentional ulcerations are distinguished from the real, by their borders being less callous, their surfaces more superficial, and less painful, and their disposition to heal, when secured against tampering, much greater, owing to their not originating in, or accompanying, constitutional disorder, as in the case of real ulcers.—In order to prevent this species of deception, Mr. C. Hutchison had recourse to a wooden box, in which he locked up the whole limb; all other means, as marked or sealed bandages, &c., having been found insufficient against the ingenuity of malingerers.

50. The Urine presents various disorders in respect of its characters and of its excretion, which have been artificially produced or feigned by persons desirous of escaping from the public services, and by hysterical females.—*Incontinence of Urine* was often simulated by sailors and soldiers. The circumstance of this disorder occurring frequently in this class of persons, who are mostly young, or in the vigour of life, should excite suspicions of its reality. The simulator generally chooses the circumstances and place suitable to his purposes in allowing the urine to escape. Laurent and Percy state that the *glans penis* is always pale and shrivelled in real incontinence, and that the urine never comes away in a stream. M. Fodéré finding that this complaint was becoming epidemic in a regiment, and that blistering the perinæum and other means did not cure it, directed the penis of every patient to be tied, and the knot sealed, none but the person guarding them being allowed to remove the ligature. The penis was observed from time to time, to ascertain whether or no distension above the ligature existed, and whether, when it was removed in order to urinate, the discharge took place *guttatim*, as in real incontinence, or in a stream. The expedient succeeded, and the epidemic vanished. (Vol. ii. p. 481.) Percy and Laurent prescribed twenty lashes to the loins, with the avowed object of exciting the weakened organs. It was unnecessary to direct it to a second case. An army surgeon directed a cold plunge-bath twice a day with equal success; and Mr. Hutchison, Mr. Comyns, and Dr. Hennen caused a strong opiate to be given at night, and the length of time the urine was retained during sleep to be watched; for, in real incontinence, the urine passes away after a short time under all circumstances. The patient may also be caused to undress and stand before the medical man at the time when he states that his urine usually passes off. In cases of feigning, the abdominal muscles will be seen contracting in order to expel it.

51. *Bloody Urine* has been simulated by the ingestion of beet-root, madder, the extract of logwood, the fruit of the prickly pear, the Indian fig, &c. But blood is more frequently mixed with the urine. Percy and Laurent state, that conscripts have injected blood into the bladder, in order to imitate hæmaturia. This disease has even been occasioned by having recourse to cantharides. A boy in Staffordshire, in 1617, having accused a woman of bewitching him, feigned various maladies; and, amongst others, the excretion of *black urine*. The wisdom of our ancestors condemned the woman to be burnt, as was usual in such cases; but the Bishop of the diocese, suspecting imposture, caused the boy to be watched, when he was detected dipping cotton in ink, and afterwards introducing it within the prepuce, in order to give the urine which he publicly voided its dark colour. (*Mem. of Literature,* vol. iv. p. 357.)

52. The excretion of *Gravel*, and of other substances, has likewise been feigned. In all such cases, as well as the foregoing, the person should be made to urinate in the presence of the physician. The real existence of gravel is ascertained beyond doubt, by close inspection and chemical analysis.—*Strictures* have also been feigned; but the passage of a bougie will always ascertain their reality in the hands of an expert surgeon. —*Suppression and Retention of Urine* have been pretended; but most frequently by convicts, and hysterical females. The introduction of the catheter, and a strict watch, will generally show the state of the case.

53. Uterine Diseases have been feigned and exaggerated, and I believe more frequently than is commonly supposed. It was attempted in one case in which I was some years ago consulted; but the object becoming apparent, I withdrew. This kind of simulation is sometimes adopted with an evident motive, as dislike of a husband, &c.; but in other cases the object is not so apparent. Dr. Thomson, of Edinburgh, mentions an instance of a female in a respectable station, who pretended to pass vesicular bodies resembling hydatids from the vagina. They were ascertained to be prepared from the intestines of a pig, and were made to resemble a string of beads.

54. Varicose Veins have been caused by ligatures or pressure made in the course of the larger trunks. They may also be aggravated, when already present, in a similar way. Attentive examination, and the means advised for ulcers (§ 49.) will generally detect the deception, and prevent it.

55. Wounds have been both pretended, and inflicted intentionally. The feigning of wounds has been sometimes practised to avoid the danger of battle, or to be mentioned in despatches. Means which may occasion the appearance of a contusion, as abrading or discolouring the surface, are chiefly resorted to. Detection will depend upon attendant circumstances and the acuteness of the surgeon. Mutilations, or intentional wounds, are more commonly resorted to, in order to avoid conscription into the public services, or to obtain pensions or a discharge. They are sometimes also practised by slaves,

mendicants, and revengeful persons. And wounds and injuries involuntarily received have been aggravated, and their healing interfered with, to answer particular purposes. Detection in many instances is difficult, but it will be necessary to consider the possibility of the patient having inflicted the wound himself, its nature and extent, its relation to the alleged cause, to the probable object desired to be accomplished, and all the circumstances connected with it, before a conclusion should be arrived at. Persons in the public services, it should be remembered, occasionally assist each other in causing mutilations, and in aggravating injuries; so that the moral as well as the physical relations of the subject should be carefully weighed in all cases.

56. I have given the sum of our knowledge as to the means of distinguishing real from feigned disease, and of preventing the consequences of successful deception. I have endeavoured to avoid extraneous matters; and have not introduced amusing instances of simulation, as my limits must be more usefully occupied. The importance of the subject is especially great to the naval and military medical officer; but it is not less so to the civil practitioner; and the success of both in detecting imposture, will mainly depend upon their science, practical knowledge, and ingenuity. With a tolerable store of each, they will seldom be placed in great difficulty, or be obliged to resort to more painful means of detection, than the disease would warrant, were it real.

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FEVER. Syn. — Πυρετος (from πυρ, *fire*); Πυρεξια, Πυρεξις. Pyrexia, Pyrexis; Febris (from ferbeo, or februo, *I cleanse*). *Fièvre*, Fr. *Fieber*, Ger. *Febbre*, Ital.

Classif. — 1. *Class*, Febrile Diseases; 1. *Order* (*Cullen*). — 3. *Class*, Diseases of Sanguineous Function; 1. *Order* (*Good*). III. Class, II. Order (*Author*, in *Preface*).

1. Defin. — *Painful lassitude, with debility of the corporeal and mental faculties, alteration of the animal heat and of the secreting functions, accelerated circulation, and increased thirst.*

2. The human frame is liable to sudden and powerful impressions from external causes, to the nature or intensity of which it is unaccustomed, and to changes throughout its functions, proceeding from imperfect or impeded actions of some excreting viscus. The derangements thus occasioned, are remarkably varied both in degree and in kind; and they constantly induce further changes, terminating either in restoration to health or in the destruction of the individual. They have been usually named and classed, according to certain distinctions assumed from their chief causes, or from their most prominent features, or from the modes in which their principal characters are grouped. As, however, the various species of change or disorder, thus supervening, insensibly glide into each other; and as some symptoms disappear, and others spring up, from different intensities and combinations of remote causes, from the states of the internal organs at the time when the morbid impression was made, and from the ever-varying influences to which the body is afterwards subjected; so it must follow that distinctions, which are thus based, will become unsafe guides in practice. The manifestations of disease possess no unalterable features; and therefore descriptions of them are to be received with due latitude, and the modes and means of removing them accommodated to individual and ever-varying conditions. From these considerations, it cannot be a matter of surprise, that such diverse opinions have existed as to the nature of those derangements which have generally received the name of *fever*; and that so much discussion has taken place respecting the differences which exist between them and other disorders, with which, although arising locally, the whole frame more or less sympathises. Nor can we wonder that, owing to the frequent difficulty of distinguishing between fevers and the disorders which thus originate, all differences between them have been denied, and that the former have been actually considered as strictly local diseases. I shall have frequent occasion, in the sequel, to notice the grounds on which this opinion is founded.

3. The intimate connection existing between all diseases, which, either at their commencement, or in their course, exhibit febrile symptoms, might have been less a source of error, if the phenomena characterising them had been traced more accurately to their origin, and with a stricter reference to their causes, than they generally have been; and if succeeding and consecutive alterations had been recognised chiefly as effects of the previous changes. If such a course of investigation had been followed, deranged actions, arising almost simultaneously throughout the system, would not so frequently have been mistaken for those which are referrible to a single organ or part; nor would derangements of the former kind have been imputed to such a source. There is no doubt that a certain class of causes will produce both local and general ailment, in different individuals, according to circumstances peculiar to each; or even in the same persons, at different periods, owing to his state, or predisposition, at

the time of their operation. But, still the more remarkable phenomena of these separate diseases proceed in a very different order, and very generally in so marked a manner, as to be easily distinguished by the close observer. The most frequently exciting causes of disorder, viz. mental distress, atmospherical vicissitudes, exposure to cold, moisture, &c., shall, according to the state of the individual at the time, produce an attack of general disease, unaccompanied by predominant affection of any particular organ; and the disorder shall commence and terminate without any complication. In a second individual, a more or less evident determination of the malady, or even inflammation, shall appear in the advanced course of the general disease, or even during convalescence. In a third, the local disorder shall be coëtaneous, and more or less co-ordinate with the general affection, or even outstrip it in violence during its course. And in a fourth person, local disease alone shall be primarily caused; on which, as it increases, and as inflammation becomes more fully developed, symptomatic fever, or the general derangement, shall supervene. These different states of diseased action follow the same cause, according to the disposition, susceptibility, or states of the system at the time. One person, according to this proposition, may have the constitutional derangement complicated with *rheumatic*, *catarrhal*, *bilious*, *nervous*, *gastric*, or *dysenteric* affection; the general disorder being attended from some early stage of its course, or from the commencement, by a heightened disease of a particular organ, or structure, and thereby constituting varieties of fever, which have been thus denominated and described by STOLL, DE HAEN, REIL, FRANK, HILDENBRAND, and others, and have occurred in epidemic forms on various occasions. Another person may have the nervous, the gastric, or the dysenteric characters superinduced in the progress of the disease, owing to external causes continuing in, or coming into operation, or to improper treatment: and a third may experience, in consequence of the pre-existing state of a particular organ or texture, an attack of inflammation, from a similar set of causes to those which produce idiopathic fever. If, therefore, the species of disease which arise from one class of causes are thus varied, owing to the predisposition of certain organs, or to the susceptibility of the whole system, their number must necessarily be further increased, and their characters very materially changed, when the additional influences of marshy exhalations, epidemic constitutions, or specific infections and contagions, come into operation. Diseased actions become not only more varied and extended by such additional causes, acting either singly or in conjunction, but also much more complicated and violent.

4. These inferences may be legitimately deduced, from an extensive survey of some of the circumstances connected with acute diseases. Their relation with such derangements as have obtained the appellation febrile, is still more intimate than with those which, strictly local at their commencement, induce consecutively general disorder. It is necessary, however, to the proper consideration of the pathology of fever, that due regard be paid to the nature and extent of its causes, and of modifying or determining influences, as far as they can be ascertained; and that a strict reference be had to the effects observed to follow the application of both classes of agents, under opposite or varying circumstances. It will also be requisite, while such an inquiry is being prosecuted, that none of the early and intermediate changes be omitted. Such omissions have but too often vitiated our speculations on the nature of disease, and more especially of fever; for, instead of recognising the early changes and states, particularly those which more directly arise from external agents, consecutive and gross effects only have more generally been seized upon, and assigned as the cause of disease. Let it not be supposed that inquiries, such as have just been recommended, are productive of no advantage in practice. The scientific practitioner will consider the most effectual means of preventing, controlling, or removing disordered actions, to be indicated by a most careful scrutiny into their nature and extent, and by a judicious inquiry into early aberrations from the healthy condition. He will view the primary derangements, in the relation they hold with their remote or occasional causes, on the one hand, and with consecutive or ultimate lesions on the other; and will thus trace each individual link of the chain of causation throughout.

5. If it be asked, What has the treatment of fever gained by our speculations as to its nature? I would answer, almost every thing. I will show this in a more demonstrative manner in the sequel, by adducing the opinions which have formerly been held upon the subject, with the practice to which they have led. But, independently of the practical results of the inquiry, there are other solid and not less alluring inducements which will operate on the inquisitive and well-tutored mind. An individual possessing a mind so constituted, feels a laudable zeal in examining into the nature of a class of disorders, which concerns not only the existence of a single individual, but influences also the prosperity of nations; and, who entertaining even a moderate idea of the responsibility which the exercise of his profession involves, can enter upon its practical discharges, in respect of this class of diseases especially, without feeling some desire of extending his knowledge of their nature, in order that the course he pursues may be both rational and successful?

6. I. GENERAL VIEW OF FEVER.—Fevers are the most prevalent of all diseases, especially in some countries and localities; and their causes frequently cannot be avoided nor counteracted by human foresight or science. They are more especially prevalent among, and injurious to, the human species, as the history of epidemic, pestilential, and other fevers fully prove; and as evinced by those infectious fevers which often occur in camps, and follow the rears of armies during warfare, and which are sometimes much more destructive than the most hard-fought battles.—Epidemic fevers are not, however, confined to the human species; the causes in which they originate, and the influence which promotes their extension, frequently affecting also the lower animals, — a circumstance of importance in our speculations respecting the origin and nature of this very important class of maladies.

7. i. CHARACTERS OF FEVER.—It is impossible

to give a *definition* of fever altogether applicable to the various forms and states it occasionally exhibits. To convey, therefore, a proper idea of what constitutes *idiopathic fever*, especially, a description instead of a definition of it is necessary; and, for this purpose, those phenomena which are the most constantly present should be selected: their presence individually, although in various degrees, constituting its essential characters; and enabling the physician, from the manner in which each presents itself, and is associated with subordinate or contingent phenomena, not merely to recognise the different varieties and conditions of fever, but also to distinguish it from diseases intimately related to it. If one, and especially if more, of these constant and essential characters be absent, idiopathic or essential fever is not present. An intimate view of its various phenomena can detect comparatively few which exist always in every form of the disease, and in some part of its course. These are — 1st, Spontaneous and painful lassitude; — 2d, Weakness of the corporeal and mental faculties; — 3d, Alterations of the secretions; — 4th, Altered animal heat; — 5th, Quickened circulation; — and, 6th, Increased thirst.

8. *a. Lassitude*, although obviously the result of a morbid impression made upon the nervous system, is generally viewed as spontaneous, the patient often not being able to refer it to a particular cause; and it is usually attended by a painful or irksome sensation in the back and limbs. It is present in every form, especially in some of the stages of fever, and is always one of the earliest and most constant symptoms. It is wanting in many of the diseases which resemble fever; and is manifestly referrible to the depressed state of nervous energy, more particularly as respects the organic nervous system.

9. *b. Weakness of the corporeal and mental Faculties* is, in many respects, a mode of the foregoing; or rather, both are associated effects of the more immediate impression made upon the system by the exciting causes of fever. This debility, as well as the lassitude, often precedes the evolution of the disease; and always attends it, but in various grades, throughout. It is especially evinced in the muscular organs; and less so in the mental faculties, particularly at the commencement. But, although these latter are not much affected as respects some manifestations, others are more evidently weakened. The powers of attention, comparison, &c. are most debilitated, and imagination least so. There are commonly a painful or confused feeling referred to the head, and a peculiar sensation with pain in the loins and limbs; these sensations being the more intense, the severer and more dangerous the disease, and sometimes amounting to an almost entire annihilation of the muscular and cerebral manifestations. These changes never reach above a slight degree in symptomatic fever, or in other diseases, unless when the brain is overwhelmed by effusion of fluid; and then the attendant symptoms, and procession of morbid phenomena, are very different.

10. *c. Lesions of the secreting and exhaling Functions* are amongst the earliest, the most constant, and most important phenomena of fever. The *exhalations* from the lungs and skin are evidently the earliest and the most affected; although the extent of the lesion cannot be readily ascercertained and duly appreciated: and it is not improbable that the more energetic causes of fever make their impression on the frame through the medium of the respiratory functions; terrestrial exhalations and infectious emanations floating in the air, and inspired along with it, affecting the nervous influence of the lungs and associated viscera, and impeding the changes which the blood undergoes during respiration. — Besides these, the salivary, the gastric, the hepatic, the intestinal, and the urinary secretions are more or less altered, as respects either quantity or quality; the alterations being somewhat different in different types and states of fever. — The early and remarkable lesions of the secreting functions, and the generally imperfect actions of the excreting organs, especially in the early stages, are important, not merely as they form a part of the circle of morbid actions characterising the disease, but as they especially lead to most of the ulterior changes and complications observed in its advanced course. They evidently depend, at their commencement, upon deficient organic nervous power, occasioning at first imperfect or scanty secretion and excretion; and, at later periods, upon the morbid or vitiated state of the blood, the secretions and excretions then frequently becoming free and copious, but altered from their healthy characters. In symptomatic fevers, the secreting and excreting functions are but slightly disordered, and seldom to the extent of vitiating the circulation.

11. *d. Alterations of Animal Heat.*—The temperature of the body is variously altered in different stages of fever. On the invasion and period of exhaustion, particularly the former, it is often below the natural standard; whilst it is generally above natural, during the period of excitement; this symptom chiefly depending upon the state of vital and nervous energy, upon the changes effected by respiration on the blood, and the resulting condition of vascular action. It is not, however, a mere increase or diminution of heat which is observed, but a peculiar or morbid alteration of it that hardly admits of description. This morbid sensation attending that produced by the change of temperature, and which the physician duly appreciates, varies somewhat in different fevers, is partly also dependent upon suppression of the cutaneous exhalation, and the state of the circulating fluids, and is most remarkable in the more dangerous and malignant forms.

12. *e. Quickened Circulation* has been considered by writers as one of the most essential symptoms of fever; and by some as the chief phenomenon; their definition of fever being increased frequency of the circulation, with lesion of the functions. But this definition would embrace equally all the diseases in which quickened circulation occurs. It should be recollected, that in some stages, particularly in malignant fevers, acceleration of the circulation is not constantly present; yet it is seldom altogether absent from the commencement. The rapidity of the circulation is, however, often of less importance, than other states of the vascular system, and the condition of the blood itself.

13. *f. Thirst* is seldom wanting in fevers, during all their course, although occasionally absent, particularly in their advanced stages, and

in cases attended by congestion of the vessels of the head. It is observed in other diseases; but it most constantly accompanies fever.—*The appetites* also are more or less affected. The *appetite for food* is diminished or entirely abolished. In rare cases, a craving for food has been observed in an advanced stage of fever, but not throughout its whole course. The appetite for the sex is also abolished until convalescence has commenced, when it re-appears, and is sometimes one of the earliest signs of amendment. These symptoms probably depend upon the same cause — upon depressed organic nervous influence, and consequent deficiency of the secretions.

14. ii. GENERAL DESCRIPTION.—The word *Fever* is used in a double sense: it is applied—1st, to that state of constitutional disturbance, in which the above symptoms are primary, essential, or idiopathic; and, 2dly, to the general disorder consequent upon, or symptomatic of, some local disease. In the latter, the febrile symptoms consist chiefly of increased heat and accelerated circulation; and without these the patient is said to be without fever. But when fever occurs primarily — is a disease *sui generis* — these two symptoms are seldom the most prominent, and are always associated with others, especially those already noticed, which may be much more manifest than they, and which are either altogether wanting in symptomatic fever, or not similarly associated, or only occasionally present. This distinction is necessary, particularly as respects the treatment, and should never be overlooked. Its importance will be more apparent in the sequel. I shall first describe fever as a disease *sui generis*; and next, as a *symptom* of inflammation, or some other disease of a particular organ or tissue.

15. IDIOPATHIC FEVER presents, during its whole progress, characteristic symptoms, not consisting merely of increased frequency of circulation and augmented heat, which are sometimes wanting in certain stages of the disease, but of other morbid phenomena that are equally important, that vary in degree and in modes of association with one another, and that superinduce other phenomena, thereby giving rise to the different forms and states in which the disease occurs; — *it commences with debility and lassitude, which are followed by chills or rigors; it is generally composed of several invasions or exacerbations; it implicates the whole of the vital endowments and faculties, the fluids, and the entire organisation; it is acute and dangerous in its course, with lesion of the circulation, with alteration of the animal heat and of the secretions, and with diminution of vital power; and it is versatile as to its symptoms and type, with efforts at sudden changes or crises.*

16. 1st. *Fever begins with lassitude and debility, generally followed by chills or rigors.* —It originates in causes which affect the vital energies of the system, and occasion debility and lassitude as the earliest and most remarkable changes. These are generally attended by an insuperable feeling of fatigue upon the least corporeal or mental exertion, by stupidity, loss of nervous and mental energy, by irritability, moroseness, or impatience, and by heaviness of the eyes. Upon these supervene various uneasy sensations; as, anxiety at the præcordia, occasioning frequent full or laboured inspirations; a peculiar and general uneasiness and restlessness; a feeling of cold, particularly along the spine, and differing from the real or usual sensation; horripilations, involuntary shudderings, and tremors or rigors. The debility giving rise to the unconquerable sense of lassitude and fatigue generally precedes the chills for some indefinite time, and accompanies them or continues after them. Chills or rigors often return and alternate with flushes, and other incipient disturbances, for a variable period.

17. 2d. *Fever is very frequently composed of several invasions or exacerbations,* one paroxysm disposing to others; as in agues and remittents. But even in continued fevers a similar circumstance very often obtains, as evinced by the evening exacerbations, and the aggravation of the symptoms on alternate days. Some writers, and more particularly HILDENBRAND, consider that, as in remittents, wherein a new invasion supervenes before the previous paroxysm had subsided, so in continued fevers, one fit runs into another. — "Continuæ ergo febres, si non omnes, saltem pleræque, præsertim criticæ, è plurimis paroxysmis febrilibus, quorum unus alterum subintrat, compositæ sunt."

18. 3d. *Fever is a disease of all the vital endowments, functions and faculties, of the fluids, and of the whole organisation.*—If we trace the progress of fever, from the operation of its causes, through successive changes, we shall find that the vital power, which is supreme over the physical properties and functions of our different structures, is deeply affected throughout all its subordinate manifestations — as the *sensibilities* of the nervous systems, the *irritability* of involuntary and voluntary muscular fibres, the *organic contractility* of membranous parts. Hence proceed lesions: — (*a*) *Of the organic functions* — of the respiratory actions and functions, of circulation and of the circulating fluids; of secretion and excretion, of digestion, assimilation, sanguifaction, and nutrition; of the appetites, both natural and acquired, &c. — (*b*) *Of the cerebro-spinal and animal faculties* — of the functions of sense and voluntary motion, and of the powers of mind: the expression of the countenance and the attitudes are changed; the senses either perform their parts imperfectly, or the mind takes an insufficient cognisance of their reports; the attention is wavering and quickly fatigued; the intellectual powers and states are languid, feeble, or otherwise disturbed; the judgment is perverted by internal and involuntary impressions and conceptions; and ultimately all the mental endowments become exhausted and disordered, by prolonged wakefulness, or overwhelmed by a continued sopor. — (*c*) *Of the fluids and whole organisation.* — The fluids and soft solids undergo changes in their appearances, form, and properties. The *blood* is evidently altered in various ways at different periods of the disease. Its serum is often at first in considerable quantity, and its crassamentum loose; but afterwards the latter generally becomes more firm or cupped; and ultimately again loose, or imperfectly separated from the serum. In many cases, it is still more remarkably altered, as shown in the article BLOOD (§ 78. *et seq.*), both in colour and consistence. The *secretions*, which are at first chiefly diminished in quantity, ultimately are changed in quality. They become more offensive, of a darker colour,

and more irritating and septic to the tissues with which they come in contact. — The *soft solids* are to a certain extent affected, owing to the changes previously induced in the powers of life and in the circulating fluids, as respects the *form, appearance*, and *properties* of all their parts. The cutaneous surface loses its lively tint, is changed in colour, or assumes a dirty, dusky, or earthy hue. The integuments become loose or turgid, harsh or burning; the muscles and cellular parts suffer a diminution of their consistence, and subsequently of their bulk; and the *physical*, as well as the *vital, properties* of all the tissues, especially their cohesion and elasticity, are very much impaired. Ultimately, the soft solids present a more flabby, dusky, brownish, or livid hue, and are softer and more lacerable than natural. Thus the eyes, lips, mouth, the countenance and whole physiognomy, the skin, the flesh, the habit of body, and the postures of the patient, exhibit the universality of disease. From these facts, *fever may be defined pathologically*, or with reference to the vital and organic changes, to be *an acute affection of all the functions, and of all the fluids and soft solids of the frame*.

19. 4th. *Fever proceeds with lesions of the circulation, of the secretions, and of the animal temperature; and with depression of vital power.*— The *pulse* is generally accelerated in some one stage or other. When it rises not above, or sinks below, the natural frequency, the cause may either be congestion of the vessels of the head, or the morbid state of the blood, or the influence of the supine posture on certain constitutions. In these cases the pulse often becomes much more frequent when the trunk of the body is raised to nearly an erect position, or even when the head is elevated (§ 12.). The *secretions* I have already stated (§ 18.) to be early and remarkably changed. The extent and consequences of the alteration will be especially considered hereafter. The *temperature* is altered during some period in all fevers. Instances, however, occur, in which increased temperature does not supervene on the cold stage: there are also cases in which coldness soon follows upon more or less of heat; and others in which the alteration either way is very slight. Still some change may be felt, generally in degree, but also in respect of other sensations connected with it, excited in the patient and in the observer. In some cases, especially early in the disease, the patient's feelings may be those of cold, whilst the surface is actually warmer than natural. The *depression of vital power* is evinced from the commencement, in all the functions; and does not the less exist, because vascular excitement or reaction becomes great or excessive during a part of the disease. Although vascular action is increased for a time in most fevers, yet vital power or resistance is lowered nevertheless, especially in other systems and organs, and is afterwards further exhausted in proportion as vascular action has run high, and it ultimately becomes remarkably lowered with the contamination of the fluids and of the soft solids; impaired power augmenting the changes of these, which, in their turn, increase the depression, and often even accelerate the extinction of life.

20. 5th. *Fever is acute and dangerous in its course.* — A single attack of fever scarcely ever continues beyond thirty days. When it is observed to remain longer, it may generally be considered symptomatic of superinduced inflammation, or of altered structure, or a relapse. Intermittents, however, are often of much longer duration, but each paroxysm may be considered as a distinct attack. Remittents, also, sometimes continue longer; but seldom or never, unless associated with visceral disease, which prolongs the febrile action, or converts it into a symptomatic fever, retaining more or less of the remittent, or passing into the continued, type. The *danger* of fever results from its nature, and varies with its type, form, and violence; for it is liable to sudden vicissitudes in its progress, and is prone to produce changes of structure having a fatal tendency. Even the most mild form of fever may suddenly change its character from internal or external causes, or from abortive or irregular efforts at a crisis, or from an injudicious regimen or treatment, and put on a most dangerous form; or, owing to predisposition or pre-existing disease of a part, give rise to fatal disorganisation in some important or vital organ.

21. 6th. *Fever is mutable in its characters.* — It is but one disease, *or genus*, comprising several species, and subordinate varieties — numerous and ever-varying forms and states resulting from the nature, the combination, and the intensity of the causes, acting upon peculiarities of constitution and predisposition. Hence we cannot be surprised to find fever *mutable* in many of its characteristic phenomena—to observe one species or variety closely approximate others — and even to meet with instances of one type, or form, suddenly or unexpectedly changing into another, in some period of its progress. Thus it is not unusual to see a simple tertian change to a quotidian or double tertian; or an intermittent pass into a remittent, or this latter into a continued form. Occasionally the disease alters from mild to severe, or from nervous to malignant. It sometimes is simple through a great part of its course, without any one organ suffering a predominating disturbance, and yet it suddenly becomes very dangerously complicated, and thereby assumes very different features.

22. 7th. *Fever evinces a tendency to sudden changes or crises*, owing to the conservative influence of vital resistance and reaction. These are generally of a salutary nature, when not rendered abortive by some external or internal cause, by the injudicious interference of art, or by pre-existent lesions of an important viscus. When they are fully evolved under the conservative influence of life, so as to lead to the salutary termination of the disease, they have usually received the name of Crises. They are observed not only in continued fevers, but still more remarkably in the paroxysms of an ague, each of which, when once commenced, will proceed until the powers of life terminate it by a critical change. Idiopathic fevers have frequently been denominated *critical*, as distinguishing them from symptomatic fevers, which less frequently experience this mode of termination, and generally in a less decisive manner. When salutary processes supervene, and are developed so as to terminate the disease, a more rapid and perfect return to health is experienced, than under other circumstances. It would seem that the evacuations by which favourable changes are brought about, are in

some respects a depuratory effort of nature, more especially as those evacuations generally occur through the medium of organs which eliminate hurtful materials from the circulating fluid. Hence, one of the safest modes of practice is that which keeps these salutary processes in view, avoiding whatever may prevent them, and promoting their evolution; attending at the same time to the preservation of the powers of life, and warding off danger from weakened, over-excited, or oppressed organs.

23. When we take into consideration the conservative influence of the vital energy, the salutary changes brought about by it, and the circumstance that every method of cure, or every agent, cannot act in a similar manner in all cases — and that, even during the most injudicious treatment, certain of the agents are calculated to meet the exigencies of some cases, either in supporting the powers of life, or in favouring or determining some critical evacuation — the reason will readily appear, why recovery often takes place in fever from the most opposite means, or when left entirely to nature; and we shall easily understand wherefore all do not die who are improperly treated, and how nature often not only overcomes the disease, but also the effects of injurious agents prescribed for it. Of the means which are employed in the treatment of fevers, there are not any which become more dangerous from inappropriate use, than the extreme measures frequently resorted to — namely, large depletions and active stimulants. The former may destroy, in a few hours, cases which nature or opposite measures might have preserved, and the latter may over-excite, and inflame to disorganisation, viscera which require to be unloaded, or to have their actions moderated.

24. It not infrequently, however, happens that the critical efforts are imperfect owing to exhausted vital power, or insufficient from the nature and severity of the disease, or misdirected or irregularly exerted in consequence of some controlling or determining influence; and hence they become sources of increased disorder, or superinduce structural change. Such results are sometimes favoured by over-active, inefficient, or inappropriate means of cure; and very often by organic lesions having taken place in so great a degree, and so early in the disease, that the salutary efforts attempted cannot subdue them, but merely tend in some instances to their aggravation and danger.

25. The *event* in fevers is *directly* produced by critical changes, and indirectly by the assistance of art: it is *favourable*, if the powers of life remain unsubdued and act without obstruction; it is *unfavourable*, if they languish or are overwhelmed. So much are we indebted to the conservative efforts of life exerted throughout the frame in the cure of fevers, that more is often to be ascribed to this source than to the interference of art; and I may add, in the words of Professor HILDENBRAND, "Inde enim pendet, quod miseri ac inepti medici famam, quam buccis inflatis non accipere, sed verecundi naturæ magistræ reddere deberent, in febribus sanandis sibi conficiunt. Inde pendet quod omnis sectæ medici, ac obpositarum medendi rationum adsectæ, de felici eventu in febrium tractatione glorientur. Inde demum pendet, quod quævis theoriarum ad febres curandas adplicata, sanatorum ægrorum practica exempla offerre valeat." (Vol. i. p. 53.)

26. SYMPTOMATIC FEVER. — Fever may be a concomitant, or an effect of another disease, which would still remain were it possible to remove the attendant fever; but which being removed, the concomitant fever would cease. In as far as it consists of accelerated circulation, fever may be associated with the majority of diseases; but it is still merely a single symptom, wherefore other phenomena should be present before even symptomatic fever ought to be said to exist. Whatever irritates or stimulates the circulating system to a stronger or more frequent action, or inflames a particular part, is productive of symptomatic fever. Its cause exists within the frame, and more rarely it acts from without; as irritation or inflammation of particular tissues; the presence of foreign bodies, or of calculi, worms, or hurtful ingesta; the absorption of hurtful or acrid matters, or of contaminating secretions; surgical operations, external injuries, and violent exertion. Fever proceeding from these sources has been termed *inflammatory*, *irritative*, *fever from irritation*, *fever of the vascular system*, *symptomatic inflammatory fever*, *symptomatic fever*, *chronic fever*, *hectic fever*, according to the peculiar irritation, or local disease, on which it attends.

27. Fever is *associated* with other diseases in a twofold manner:—1st. *Essentially*, forming what are called *febrile diseases* or *symptomatic fevers* strictly speaking; as in *tabes purulenta*, in which it is merely a symptom, but one which is uniformly present. 2d. *Accidentally* or *contingently*, not naturally and constantly, but merely from the association of some occasional disturbance or complication, as in amenorrhœa, chlorosis, dropsy, rheumatalgia, &c.; or as a consequence of treatment. In symptomatic fevers, the constitutional affection is neither so severe, nor so generally and equally extended to all the functions, nor so entirely implicates the fluids and soft solids, as in idiopathic fever. Hence they are more readily traced to their origin — to the irritation in which they arise. The functions which chiefly manifest disturbance in their progress are those of circulation and secretion — the latter often very slightly. Others are also occasionally disturbed, as those of the skin and of the nervous system, but generally in an indirect and slight manner. Consequently the chief characters of symptomatic fevers are quickened pulse, heat of skin, disorder of its transpiration, and thirst. The excretions, muscular power, and the faculties of mind, are but little altered. The pulse retains greater tone and sharpness, and the general surface more animation, than in idiopathic fever. The external physiognomy, the posture, the extreme prostration of muscular power, the profound alterations of the vital endowments of the fluids and of the organisation itself, characterising the latter, are either altogether absent, or present in a very slight degree merely, unless when morbid matters are conveyed into the circulation during the course of certain symptomatic fevers, and thereby vitiate both it and the soft solids, disordering also the different secretions and excretions. Such occurrences sometimes take place, and have fallen repeatedly under my observation, particularly when inflammation attacks the internal surface of

vessels, or when purulent or sanious matters are taken up and conveyed into the blood, as in certain puerperal and other diseases. The vitiation of the circulation thus produced, and the effects upon the nervous system and other structures, are such as to give rise to a state of disease altogether similar to some of the worst forms of idiopathic fever.

28. The *duration* of symptomatic fevers depends entirely upon the nature of their causes, and the permanence of the original affection from which they proceed. Sometimes they are short, or even ephemeral, the irritation which occasioned them being removed by the actions which it induced: in other cases, their continuance is often very long. But the character of the phenomena experiences but little alteration, and they seldom undergo much change in their type. They are not, however, devoid of efforts at a critical evacuation; but these are more frequently inefficient and abortive, than in idiopathic fevers, owing more to their being insufficient to remove the primary malady than to defective vital energy. They are, however, occasionally relieved or even removed by spontaneous hæmorrhages, vomitings, diarrhœa, copious perspirations, and critical secretions of urine. Unfavourable terminations frequently also take place owing to congestions, obstructions, or disorganisations in some vital organ, arresting its functions. The *treatment* of symptomatic fevers is necessarily directed less to the particular phenomena they present, and more to their origin, than that of idiopathic fever. It is generally founded upon the intention to remove the cause; and, when this cannot be accomplished, to render it less injurious.

29. II. THE DIAGNOSIS OF FEVER. — From the description which has been given of the pathognomonic symptoms of *idiopathic fever*, and of the general characters of *symptomatic fevers*, the differences between both, and between the former and other diseases, will be evident. The distinctions just stated between idiopathic and symptomatic fever equally exist between the former and *inflammation*; this latter being one of the chief causes of symptomatic fever. Inflammation, in its primary and phlegmonoid form, attacks not only a single tissue or part, but also in a manner indicating its locality; the resulting constitutional affection differing in its mode of supervention and in its characters (§ 7. *et seq.*), from fever, as above described. It should, however, be recollected that inflammation frequently supervenes in parts or organs at some period of the course of idiopathic fever, or even at its commencement; and indeed the fevers of some seasons, or epidemics, are very generally thus *complicated*. In these cases, however, the inflammation does not present the characters it assumes in the previously healthy frame, but those it puts on when occurring in a very unhealthy or cachectic habit of body; it being engrafted, when supervening in the course of idiopathic fever, upon a morbid condition of the constitution as respects the vital endowments, the fluids, and the soft solids. Hence, when once excited, particularly in membranous or cellular parts, inflammation rapidly extends or passes into disorganisation, owing to the remaining tone of the vessels, and to the already reduced vital resistance being rapidly exhausted by the generally as well as locally increased vascular action. It presents, in such circumstances, many of the characters possessed by erysipelatous inflammation, and very nearly approximates to it; but is frequently still more dangerous, insidious, and rapid in its progress to fatal disorganisation.

30. Fever differs from diseases usually denominated *cachectic*, inasmuch as in them the external habit and appearance of the soft solids are principally affected, and the powers of life much less than in fever. They supervene gradually and imperceptibly, and proceed slowly, without much, or even any, acceleration of pulse, or increase of temperature. They present not the complete prostration of muscular power, the versatility of character, the mutability or disposition to change, and the efforts at vital reaction, which distinguish fever; and nature does little towards removing them, whilst art effects much.

31. Fever differs from disorders termed *nervous*, in the latter being altogether referrible to the cerebro-spinal nervous system, or parts intimately connected with it, whilst other systems and organs are either unaffected or not proportionately affected. They present but little change of the circulation, or of animal heat, or of the secretions, or of the intrinsic condition of muscular power, or of the soft solids in general. They are, moreover, generally chronic; they follow no determinate course, are cured with difficulty, and yet are seldom removed by the unaided efforts of nature. Other diseases, as those which are local or attended with increased discharges, are at once distinguishable from fevers by their essential or pathognomonic symptoms.

32. III. OF THE GENERAL COURSE OF FEVER. — Fever commonly runs a determinate course, unless death occur so early as to prevent it. In order to give precision to our knowledge of the usual progress of the disease, and to enable us to employ the means of cure with a stricter reference to existing pathological conditions, several stages or periods have usually been pointed out, according to the changes observed in its course. Writers have differed materially as to the number of stages into which fever should be divided, and as to the terms by which they should be designated. As respects eruptive fevers, no difficulty need exist as to either. I shall pursue, therefore, that arrangement which my observation of the progress of fever has convinced me to be correct, and which is applicable to continued and periodic fevers equally with those which are eruptive. — Fever consists — 1st. Of the *formative* or precursory stage; — 2d. Of the period of *invasion*; — 3d. Of *excitement or reaction*, comprising (*a*) *incremental* excitement, and (*b*) *stationary* excitement; — 4th. Of the stage of *crises*; — 5th. Of *decrement*, or decline; — and, 6th. Of the period of *convalescence*.

33. *A. The Formative or Precursory Stage; Stadium Opportunitatis*, HILDENBRAND; *Stadium Prodromorum*, REICHE, HELLING, and RICHTER; *The latent Period*, of Dr. MARSH; *The Stage of Incubation*, of French writers; *The dormant Period*, of English authors. — Although the precursory symptoms of fever have been fully enumerated by CELSUS (*De Med.* lib. ii. cap. 2.), they were overlooked by writers until the middle of the last century, when TISSOT, REICHE, and HELLING, directed attention to them. FORDYCE, and other more recent authors on fever in this country, have left them entirely unnoticed. In my papers on fever published between 1819

and 1828, and in my lectures delivered from 1823 to 1827, particular notice was directed to the subject, and these symptoms were described as constituting a most important stage of the disease, inasmuch as in it the nature of fever would be most advantageously studied, and either its subsequent course remarkably meliorated, or its further progress prevented, by appropriate and energetic treatment. (*Lond. Med. Repos.* vol. xxviii. p. 238.; and other *Refer. in Bibliog.*)

34. The phenomena described above, as characteristic of idiopathic fever, never proceed immediately from the remote causes. The impression made by them occasions a succession of changes before those which really constitute fever supervene. These early changes, being productive of those which constitute the developed disease, may aptly be called *formative;* and the symptoms by which they are indicated, *precursory.* The exciting causes of fever seem to act primarily upon the nervous system of organic life, thereby producing changes in the vital manifestations of the frame, which gradually increase until they arrive at a certain pitch, and terminate in one of the modes hereafter to be noticed. The more intense the exciting causes, the predisposition being equal, the shorter will be the duration of this period, and the sooner will the lesions constituting fever be brought about (§ 15.). — (*a*) The earliest effect which is made manifest after exposure to the more energetic causes of fever, as infectious effluvia or noxious exhalations, is a feeling of constriction or oppression in the chest or at the præcordia, attended by frequent sighing, gaping, forced and lengthened inspirations, and by a sense of uneasy depression, or nausea, evincing the morbid impression made upon the nervous system through the respiratory organs. The pulse is weak, slow, irregular, sometimes remittent or reduplicating, and readily accelerated by slight exertion. — (*b*) The natural and acquired appetites and desires are diminished; nausea is readily excited by food; and the bowels are either costive or easily acted upon by purgatives; *Venus silet*, and all the *organic functions* are impaired. — (*c*) The patient feels debilitated and fatigued; complains of headach, vertigo, or confusion of ideas; is morose, low-spirited, sluggish, indolent, or incapable of exertion and of directing his attention long to any object; he readily perspires, and his breathing becomes short and quick, on the least exertion; his sleep is unsound and unrefreshing, and he awakens with a sense of lassitude or with pains in his back and limbs,—in short, all the *cerebro-spinal functions* are weakened or disordered. — (*d*) The external expression and appearance are somewhat altered. The countenance and skin are unusually pale, sallow, or unhealthy; more rarely red. The eyes are languid, and deficient in brilliancy. The breath is fœtid or cool; and the tongue often loaded. The urine is sometimes pale and copious; and the cutaneous surface dry, cool, and harsh. These symptoms vary in severity, and often are so slight as to escape particular attention. They frequently are insufficient to induce the patient to confine himself. — (*e*) The *duration* of this stage is various in different fevers — from twenty-four hours, as in plague and some cases of typhus, to several weeks, as in ague; but it is generally from three to fourteen days. The severer and the shorter this period is, the more acute and the more rapid will be the subsequent progress of the disease, and *vice versâ:* there are, however, exceptions to this. Fever may be cut short in this stage by active and judicious means; but not afterwards, unless occasionally in slight cases. — (*f*) The *pathological conditions* characterising this stage, are, depression of vital power throughout the frame, with slight internal congestion, particularly of the lungs, liver, &c.; with imperfect change of the blood in the lungs, and with diminished secretion and excretion.

35. B. *Stage of Invasion; Principium vel Initium Febris,* Auct. var. — (*a*) *The cold stage*, of writers — is attended by debility, lassitude, painful uneasiness, or sinking at the epigastrium, a sensation resembling cold running down the back, with formication or chills extending over the limbs and general surface. The pulse is constricted, small, weak, or accelerated; the respiration is slow, irregular, or suspirious, and attended by anxiety at the præcordia, and occasionally by a slight dry cough. On these supervene gaping, sighing, pandiculation; a sense of weight, pain, or constriction in the head; giddiness, moroseness, depression of spirits, and disorder of the senses; lividity of the lips and nails; pallor of the skin; the cutis anserina, and shudderings, rigors, or shiverings, followed by or alternating with irregular flushes. After the rigors cease, a sense of chilliness often continues for some time, although the skin has become hot. These symptoms present various grades and modifications in the different types of fever: in some the feeling of cold is actually attended by reduction of the temperature; and in others the heat is not materially, if at all, diminished, or it is even increased. The former is most commonly seen in the cold stage of periodic fevers, the latter in the invasion of continued fevers. In all, however, the cutaneous transpiration is altogether arrested, and the skin is harsh and dry. The pulmonary exhalation is also diminished, and the breath is cold. Copious discharges of pale urine often take place, evidently arising out of the arrest of the exhalation from the skin and lungs. Loss of the appetites, costiveness, thirst, and occasionally sickness and vomiting, are likewise present. — (*b*) The *duration* of this period may be very short; or it may be for many hours, alternating with slight flushes. The shorter and more intense it is, and the severer the rigors, the shorter and severer will be the consequent vascular reaction, and the more nearly approaching the inflammatory type; and the longer its duration, the more prolonged will be the fever. The imperfect evolution of this stage, or its slight occurrence, particularly when it is not attended by rigors, very generally indicates a severe malignant or typhoid state of disease. In some of the most dangerous cases of fever, I have seen this stage so slight, as to be confounded with the preceding one. This period having supervened, the disease cannot readily be cut short by bloodletting, emetics, &c.; although in the slighter cases, and more inflammatory type, these means have succeeded in some instances. — (*c*) The *pathological states* of the first period are increased in this, particularly the general depression of vital endowment; the impeded functions of the lungs

liver, &c.; the interrupted exhalation and secretion, excepting the urinary secretion; and the imperfect depuration and arterialisation of the blood. But the lowered vital powers become more centralised; and the congestion of the large vessels, especially those of the thoracic and abdominal viscera, greater, — conditions which terminate themselves, by inducing rigors, shivering, vomiting, and reaction of the vascular system, with the subordinate phenomena of the next stage.

36. *C. Period of Excitement.* — α. *Incremental excitement* or *re-action* — *incrementum vel augmentum morbi.* — (*a*) This stage commences with the disappearance of certain of the foregoing signs, with the increase of those that remain, and with the supervention of others. Fever in its more literal sense now begins, and manifests its specific form. The gaping, pandiculation, formication, and rigors disappear; and the stricture and collapse of the countenance and general surface are followed by increased warmth and turgescence. The chilliness, however, continues for a short time. Pulmonary transpiration returns in some degree; respiration becomes full, frequent, and sometimes laboured, and the breath hot. The urine is now diminished, high-coloured, limpid and clear, and its discharge is often attended by scalding. The muscular debility, feeling of fatigue or lassitude, the pains in the head, loins, and limbs, the thirst, and the anxiety at the præcordia, are all increased. The countenance becomes turgid; the eyes shining, but with an expression of languor; the cheeks flushed, and the cutaneous surface hot, burning, and turgescent. The appetites are now entirely abolished; the tongue is loaded or furred, or both; the pulse is free, full, and accelerated; often strong, and vibrating in the neck; but varies remarkably in tone with the particular variety of the disease. There are also a sense of weight, fulness, and aching of the head, with giddiness, confusion of ideas, and sometimes with mental indifference, which short and disturbed slumbers seem to aggravate; a morbid susceptibility or disorder of the senses; and occasionally moroseness, restlessness, or jactitation. These symptoms generally increase, often presenting in the continued type slight remissions in the morning, with exacerbations in the afternoon and evening, which are most severe on alternate days; and, during the progress of this stage, delirium often supervenes, especially when it reaches its height. — (*b*) The *duration* of incremental reaction or excitement varies with the type and form of the disease — from an hour or two, as in ague, to two or three days, as in continued fevers. It is generally shortest in the most severe and violent attacks; but it never extends beyond seven days. — (*c*) It consists, *pathologically*, of reaction of the vital powers, expressed chiefly in the vascular system, frequently with a preponderance or determination towards particular organs — of the efforts of life to overcome the more immediate effects of the exciting causes, especially the internal congestions, and the superinduced changes in the blood.

37. During this stage, *determination* to particular organs or textures frequently occurs, and thus the fever becomes *complicated*, or resembles idiopathic *inflammation* the more closely, the less severely the vital power and the circulating fluids are impaired or vitiated. Such determinations or consecutive inflammations are observed principally in the *encephalon, spinal chord, lungs, liver, stomach,* and *bowels;* they are caused chiefly by the predisposition, previous diseases, and existing states, of these viscera; and by climate, season, habits, and occupations, and the circumstances of the individual; whatever disorders, irritates, weakens, or causes habitual determination, or increased momentum of the circulation to either of these organs, thus complicating the fever. Hence the *cerebral complication* is most common in the studious; the *gastric* and *hepatic,* in those addicted to the pleasures of the table or to intemperance, and in hot climates, or during warm seasons; the *pulmonary,* in cold countries and seasons, and in persons much exposed to the open air; and the *intestinal* or dysenteric, in the ill-fed, in persons using unwholesome water or living upon innutritious and watery food, and in low and moist situations. The *prevailing epidemic* constitution has also a most powerful influence; the complications, as well as the particular form and type, of fever, depending upon it, and the nature of the exciting, concurring, and determining causes.

38. β. *Stationary re-action* — *stadium coctionis* of the humoralists — consists of the persistance of the above symptoms, with slight modifications, and frequently with increased affection of particular organs. — (*a*) During its progress, restlessness continues, with watchfulness; delirium is often constant, or appears for the first time; nervous power is gradually and almost imperceptibly exhausted; the pulse generally loses tone, and becomes more accelerated; the tongue is deeply furred and loaded, and often also parched, and mucous sordes collect about the teeth. Respiration is quick, or moaning, and the breath is foul, heavy, offensive, sickly, and loaded with vapour; the urine is still scanty, high-coloured, and clear; the bowels are either costive or irregular, and the stools morbid and offensive; the countenance becomes pale, heavy, collapsed, and of a sallow or unhealthy hue — sometimes muddy or lurid; the eyes are suffused, watery, heavy, and occasionally injected; the skin continues hot, pungent, or burning, and it afterwards either evinces a disposition to transpiration, or becomes damp and clammy; or it is the seat of petechiæ, or of eruptions, which, in the exanthematous fevers, appear at an early part of this stage; the prostration of muscular power is increased, and is often so great that the patient cannot retain his position on one side, but falls into the supine posture; adipose matter is subsequently absorbed, and the body lives upon itself; and, if the patient be not delirious, he complains of severe pains, or of a bruised sensation, or of soreness in his limbs, back, and loins, with confusion, vertigo, or pain in his head.

39. (*b*) The symptoms vary remarkably in this stage with the type and form the fever assumes — with the complications above alluded to — with those which may supervene during the advanced progress of this period — with the more latent changes in the mucous surfaces, or in parenchymatous structures — and with various influences and circumstances occurring during the disease. In some varieties of the continued type of fever, the whole of this period proceeds with little or no

evening exacerbation, whilst, in others, exacerbations are very manifest; but this depends much upon the prevailing epidemic constitution. In general, fever caused by infection, and complicated with serious visceral disease, or characterised by severe affection of the fluids and soft solids, is strictly continued; whilst that produced by terrestrial emanations assumes somewhat of the remittent form, although presenting much of the continued type.—(*c*) The *duration* of this state of vascular reaction is shortest in agues, in which it does not exceed a very few hours; and, in continued fevers, it is brief in proportion to the severity of the disease. It rarely, even in the more protracted cases, exceeds fourteen days.—(*d*) The *pathological states* of the early part of this stage continue in great measure in this part of it; but vascular action exceeds vital power, which is gradually lowered; and the circulating and secreted fluids and the solids themselves become vitiated as already stated, and as will be more particularly shown in the sequel.

40. *D.* The *period of Crisis — Stadium Criseos —Judicium Febris.* — Crisis in fevers is a sudden change taking place at a particular period of the disease, and terminating it. A crisis is brought about chiefly by the efforts of nature, or, in other words, by the febrile action itself inducing changes in the functions and organs, productive of a salutary effect. Although it often takes place by the unaided efforts of life, it is frequently assisted by art, and should not therefore be preferred before art judiciously employed. The *critical days* are the 2d, 3d, 4th, and 5th (quotidian period); the 7th, 9th, and 11th (the tertian period); the 14th, 17th, and 20th (the quartan period). After the 20th, crises are obscure, and seldom occur till the 27th or 28th. Salutary changes are observed chiefly on the above, unfavourable changes on the intervening days; but death may happen on any day. A very cold climate or season, or either extreme of temperature, the impure air of an hospital, the continued operation of the causes, the complications, great vitiation of the fluids and solids, an active treatment, interfere with, retard, or prevent crises. If the exacerbations be well marked, and vital energy not very much reduced, a favourable crisis may be more confidently expected. Crises are sometimes *indecisive*, or consist of several abortive attempts before the end is attained, especially when the powers of life are much lowered. When several critical efforts are required, each succeeding one renders the task more easy for the next, until the disease is gradually subdued. (See CRISIS, and *Critical Evacuations.*)

41. *E. Period of Decline — Decrementum — Declinatio.* — Sometimes the decline is prompt and rapid, especially after a marked crisis (see art. CRISIS); at other times it is gradual and slow, particularly when only slight and imperfect crises have occurred, or when the disease terminates in resolution without any very manifest critical evacuation. In the former case, the decline passes quickly into convalescence; in the latter, this stage is often characterised by slight exacerbations, called by some writers posthumous crises, which are apt to be misunderstood. In the fevers of this country, which frequently decline gradually, or in the second of these modes, the symptoms indicative of vital disturbance generally subside in the order in which they appeared. Organic nervous influence and the dependent functions are the first to be restored; the respiratory, secreting, and excreting actions become natural; the perspiration more general, free, and, if it have previously been offensive, clammy, or partial, more natural and genial; the tongue begins to clean on the sides and point, and is more moistened by commencing return of the secretions poured into the mouth; coma and delirium subside; and the patient regains his power over the alvine excretions, if it has been lost; the sensorial faculties and sleep reappear, and the latter becomes more refreshing; the locomotive powers are freer and more energetic, the patient being enabled to turn upon his side, the sense of soreness and lassitude being diminished; the appetites and desires return, and the excretions are gradually re-established. The action of the heart is the last to subside to its natural frequency, and generally continues long afterwards to be readily excited by slight stimuli. The urine is abundant, and deposits a copious sediment; the bowels become free, the motions consistent and feculent, and the skin gradually assumes a clear and healthy appearance; but emaciation increases rapidly, or now is more apparent; absorption, more especially of the less animalised and less highly organised parts or molecules, proceeding rapidly as soon as vascular reaction subsides.

42. *F. Convalescence—Stadium Refectionis— Convalescentia.* — I agree with RICHTER and HILDENBRAND in considering this as a stage of fever. The propriety of this view is obvious, especially as regards the future health of the patient. It is, however, altogether distinct from the malady, inasmuch as it does not present any of the constituent phenomena, which still continued to exist in the stage of decline, but merely those of debility consequent upon acute disease. During its early progress, the bulk of the body still continues to diminish, or does not increase until it is far advanced; all the symptoms entirely disappear; the appetites, desires, digestive functions, the secretions and excretions, are re-established, but are apt to be disordered, and therefore require supervision; the cuticle and sometimes the nails are exfoliated, and the hair falls out. Irritability and sensibility often are increased; and tinnitus aurium is sometimes troublesome; but these subside as health is restored.—*Relapses* are apt to occur in this period, especially from premature exposure or indulgences, or from disorder of the digestive organs; but they more rarely follow when fever arises from infection or from a specific contagion, though other diseases may be thereby occasioned.

43. IV. OF THE TYPES AND FORMS OF FEVER. — i. These are determined by the following *circumstances*: — *a.* By the *previous health*, the temperament, and habit of body, and vital energy of the patient; — *b.* By the state of the vascular system, particularly as to the existence of fulness or deficiency of blood; — *c.* By the *specific* kind of *miasm* or *cause* exciting fever; — *d.* By other causes, predisposing, exciting, concurring, and determining; and by the intensity of their action; — *e.* By the *external* and *internal* — the *physical* and *moral* — *influences*, to which the patient is subjected, from the period at which

the morbid impression was made upon the frame; — *f*. By the *internal congestions, determinations,* or *inflammations* superinduced in its early course; — *g*. By the *intensity of the morbid impression* made upon the vital endowments, especially of the organic and cerebro-spinal nervous systems; — *h*. By the degree to which vital power is suppressed or lowered throughout the frame; — *i*. By *vitiation of the circulating fluids* and soft solids; — and, *k*. By the treatment and regimen during the commencement and early progress of the fever. These circumstances both determine the particular type, the form, and the complications of fever, and change one type or form into another.

44. ii. The *Types and Forms,* which usually present themselves as the result of the remote and efficient causes, and as influenced by the above circumstances, are — *A*. The INTERMITTENT, — *a*. of a *quotidian,* — *b*. of a *tertian,* — *c*. of a *quartan,* type; either of which may be — *α. simple,* — *β. double* or *reduplicating,* or *irregular,* — and, *γ. complicated* — 1st, with abdominal visceral disease, — 2dly, with cerebro-spinal affection, — 3dly, with alterations of the fluids and soft solids, — and, 4thly, with visceral lesion and with change of the fluids and solids — the pernicious or malignant agues of some parts, particularly in warm climates. — *B*. The REMITTENT: — *a. Simple,* — *b. bilious,* — *c. inflammatory,* — *d. bilio-inflammatory,* — *e. adynamic* or *malignant,* — *f. gastro-adynamic,* — *g. typho-adynamic,* or associated with severe cerebral affection, — *h. complicated* — *α*. with *pulmonary disease* — *β*. with disease of the spleen, — *γ*. with disease of the large bowels, — *i. slight* and *chronic,* — *C*. The CONTINUED: — *a. Ardent fever,* — *α*. diary fever, — *β*. bilious, inflammatory fever; — *b. Synochoid,* — *α*. simple, — *β*. complicated, with predominant affection — 1st, of the stomach and liver — *mild gastric fever,* of authors; — 2dly, of the intestinal mucous surface — *mucous fever,* — 3dly, of the cerebro-spinal system — *nervous fever*; — *c. Adynamic fever,* — *α*. simple, — *β*. complicated with predominant affection — 1st, of the gastro-intestinal mucous surface — *adynamic,* of French writers, — 2dly, of the lungs and bronchi, — 3dly, of the cerebro-spinal nervous system — *ataxic,* of PINEL, — 4thly, of the mucous surfaces and brain — *typhus,* of writers; — 5thly, of these surfaces, brain and skin, with petechiæ — *petechial typhus,* or with efflorescence — exanthematic typhus (HILDENBRAND), — 6thly, of the vascular system and circulating fluids — *malignant or putrid fever,* — 7thly, of the fluids and solids, and of the gastro-intestinal mucous surface, with yellow skin — *epidemic yellow fever*; — 8thly, of the fluids and solids, and of the lymphatic glands — *plague* and *pestilential fever,* — 9thly, of the vascular system and blood, and of the lungs and gastro-intestinal mucous surface, with spasms — *pestilential cholera.* — *D*. EXANTHEMATOUS FEVERS: — *a. Scarlet fever,* — *α*. mild or benign, — *β*. synochoid scarlatina, — (*a*) simple, — (*b*) complicated; — *γ*. adynamic scarlatina — (*a*) simple — (*b*) complicated, — the complications in both varieties being with inflammation of the throat, or of the gastro-intestinal mucous surface, or of the membranes of the brain, or of the respiratory surfaces, or with any two or three of them; — *b. Measles,* — *α*. mild, — *β*. synochoid measles, — (*a*) simple — (*b*) complicated, — *γ*. adynamic measles — (*a*) simple — (*b*) complicated — the complications being nearly as above; — *c. Small-pox,* — *α*. mild, — *β*. synochal — (*a*) simple — (*b*) complicated, — *β*. adynamic or confluent — (*a*) simple — (*b*) complicated — the complications being nearly as above; — *d. Erysipelas* may be similarly divided. — *E*. PUERPERAL FEVERS: — *a. Inflammatory,* — *α*. inflammation of the uterus — *β*. of the ovaria and tubes — *γ*. of the peritoneum — *δ*. of any two or all of them; — *b. Synochoid puerperal fever,* — *α*. complicated with inflammation of the peritoneum — *β*. with inflammation of the uterine veins, &c. — *γ*. with inflammation of the uterus and appendages; — *c. Adynamic puerperal fever,* — *α*. simple — *β*. complicated with predominant affection — (*a*) of the blood — (*b*) of the fluids and peritoneum — (*c*) of the fluids, serous surfaces, and soft solids generally — (*d*) of the uterus, or of the uterus and appendages — (*e*) of the internal surface of the uterine vessels, substance of the uterus, &c.

45. iii. *Of the Conversion of Type, Form, &c.* — The above types, forms, and states, not only may result from some one or more of the above circumstances (§ 43.), but they also may be variously changed and modified by them, during the course of the disease — a simple state of fever becoming more intense or complicated, according to determining influences — the intermittent type becoming irregular or complicated, or passing into a simple, severe, or complicated remittent, and this latter into the continued type, frequently with predominant affection, either of the nervous or vascular system, or of some important viscus, or of both. This change of a slighter into a severer disease, and of simpler states into those which are more complicated, commonly arises from the circumstances just stated (§ 43.), and more especially from those concurring and determining *causes* about to be enumerated (§ 64, 65.); and is much more frequent than an alteration from a severe to a slighter form of fever, as that of a continued to a remittent, or of the latter to an intermittent type, which, however, sometimes occurs.

46. V. TERMINATIONS. — *Fevers terminate* — 1st, in a return to health; — 2dly, in some other disease; — and, 3dly, in death. *A. A termination in health* is favoured — *a*. by a previously sound constitution, and a spare habit of body; — *b*. by the absence of great intensity of the remote causes, and by their nature; those which are slight, or which proceed from endemic sources, or act singly, being less noxious than those arising from living animal bodies crowded together, or from the sick, or from various associations of animal effluvia, and of other causes; — *c*. by the absence of unfavourable influences and accidents, physical or moral, during the progress of the disease, — *d*. by a complete removal from the continued operation of the exciting, and even of the predisposing, causes during the treatment, and by the advantages of wholesome air and judicious management; — *e*. by the easy circumstances and equable mind of the patient; — and, *f*. by the occurrence of a crisis. The *modes* by which fevers terminate in health, are — 1st, by crisis, to the production of which art can only indirectly tend, but still tends very powerfully in some cases; — 2dly, by a resolution of the disease, without any critical discharge. This is the most

frequent mode observed in the fevers of this climate; and results, in a great measure, from the treatment adopted for them, particularly in their early stages, which generally interferes with, or prevents the occurrence of, the natural evacuations constituting *crises* (see this article). It is chiefly when artificial evacuations have not been pushed far, that crises manifest themselves.

47. *B. Terminations in other diseases* are owing — *a.* to previous disease, or the condition of particular viscera at the time of attack; — *b.* to the severity and concurrence of the causes, and the intensity of the disease; — *c.* to local determinations supervening during the progress of fever, giving rise to complications; — *d.* to improper treatment, as a too heating regimen, the continued use of cathartics, or the adoption of such as are too irritating; — *e.* to incomplete or imperfect crises; — *f.* to the too early or too liberal use of stimulants or tonics during the disease, or during convalescence; — *g.* to the continued operation of the causes during treatment; — *h.* to the occurrence of new, determining, or superadded causes, as crowding of the sick, bad ventilation, mental perturbations, in the progress of the malady; — and, *i.* to neglect, and to a blind confidence in the efforts of life. *The diseases* which may be thus superinduced, are — α. inflammations of particular organs; — β. engorgements, obstructions, and enlargements of glandular viscera, particularly the spleen or liver; — γ. effusion of serous fluids into shut cavities, as into the peritoneal and pleural sacs; — δ. partial or general anasarca; — ε. ulceration or abrasion of mucous surfaces — chronic diarrhœa and dysentery; — ζ. hæmorrhage from mucous membranes; — η. inflammation of some part of the vascular system; — ϑ. apoplectic, paralytic, or epileptic seizures; — ι. mania and insanity in some one of its forms.

48. *C. A termination in death* is favoured — *a.* by constitutional vice, excessive vascular fulness, and a bad habit of body; — *b.* by the intensity of the cause and of the disease; — *c.* by the continued operation of the chief causes; — *d.* by the nature of the complication; — *e.* by neglect or improper treatment; — *f.* by unfavourable crises; — and, *h.* by the other circumstances just mentioned (§ 47.) as productive of consecutive diseases. — This *result* cannot be imputed to any single change. Two or even more of the following are evidently concerned in its production: — α. Extreme suppression of organic, nervous, or vital power; — β. Lesions of organs arresting their functions, and impeding those actions necessary to continuance of life; — γ. Vitiation of the fluids, changing the condition of, or destroying, nervous influence and the rest of the vital manifestations; — δ. Exhaustion of vital power, and alterations of the intimate organisation of the viscera, as in malignant fevers; — ε. Organic injury sustained by the nervous system, especially its larger masses; — ζ. Diminished or exhausted irritability of the heart, the patient expiring as in fatal syncope; — η. Suffocation from effusion into the bronchi; — ϑ. Congestion of the lungs, heart, and large vessels, to an extent beyond the vital power of these parts to overcome; — and, ι. Deficiency of blood so considerable as to destroy the relative conditions of the contained fluid and containing vessels; for when the tonicity, the organic contractility, of the latter is much impaired, as in the advanced stages of adynamic fevers, and the amount of circulating fluid is also greatly lessened, the vessels will be unable to accommodate themselves to their contents, and the consequences must necessarily be most dangerous, if not speedily fatal.

49. VI. Of the Appearances after Death. — *A.* — *a.* Cases have been met with, wherein the most careful examination has failed to detect any lesion, or strictly morbid appearance, in any of the general systems, or individual textures, or in the fluids contained in the large vessels. It must be admitted, therefore, that changes may take place in the nervous system, or in the blood, sufficient to cause the most acute disease, or even to subvert life, without being so gross as to be demonstrable to our senses; but allowing this, the fact now stated is important, inasmuch as it most materially affects the question as to the nature of fever. — *b.* Other cases have been observed — and much more frequently than the foregoing — in which the morbid appearances were not commensurate with the intensity of the symptoms referrible to their seats, and were quite insufficient to account for a fatal issue. — *c.* Frequently also, lesions of parts have been discovered, which were not indicated by symptoms, or by the usual symptoms, or very slightly and imperfectly; those changes having been more or less, or even entirely, latent during life, although their nature evinced their existence and progress during the advanced stages of the disease. This circumstance may have arisen from an oppressed or exhausted state of the brain; or from the changes in the circulating fluid impairing sensibility; or, as Dr. Alison suggests, in his very able and lucid exposition of the Pathology of Fever, from an enfeebled state of the circulation at the time when these local affections take place.

50. *B. As to the nature of the changes observed*, opinions are somewhat different. — Many writers have viewed them as purely inflammatory; others as consequences of irritation, or of inflammatory irritation; this condition being viewed by them as a lesser grade or modification of inflammation. It is important to entertain precise ideas as to their nature; and to mark the circumstances in which they differ from those changes indisputably resulting from pure inflammation, particularly as occurring in a previously healthy constitution. — 1st. The lesions observed in fevers rarely present effusions of lymph or pus, especially in the adynamic and typhoid fevers, — consequences commonly following true inflammation; and the cases in which these effusions have been detected, have been instances of local inflammation supervening in the course of the more sthenic or inflammatory forms of fever. — 2dly. The lesions or inflammatory appearances have been more superficial, diffused, and attended with a darker discolouration, and greater softening of the affected and adjoining parts, than in idiopathic inflammation. — 3dly. The appearances thus characterised, differ the more from inflammation, the lower the type of fever and the more vitiated the circulating fluids. — 4thly. They more nearly resemble erysipelatous inflammation, than any other. — 5thly. They are met with in certain tissues more frequently than in others; and, excepting deficient

cohesion and discolouration, are commonly limited to these tissues.

51. *C.* The *organs most frequently altered in structure*, are, the digestive mucous surface, the liver, the spleen, the bronchial surface, the lungs, and the brain and its membranes. But the frequency of the alterations of each differs widely in different fevers; the first and last of these textures being upon the whole most frequently and seriously changed. — *a. The digestive mucous surface* is very generally affected in some fevers, particularly in certain that are endemic, as in the fevers of Paris, and in warm or marshy countries. The alterations of it are often insidious, latent, or much greater than the symptoms indicated; and they differ from the appearances commonly resulting from common inflammation, in the dark discolouration attending them, in their being confined to spots or patches, and in the less frequent effusion of lymph. —They consist — 1st, of livid or brownish red patches, covered by a dark reddish mucus; — 2dly, of softening, tumefaction, or thickening of the discoloured spots: — 3dly, of infiltration of the submucous tissue with dark or sanious fluids resembling small ecchymoses or internal petechiæ; — 4thly, more rarely of effusions of small portions of lymph in spots scattered over the membrane; — 5thly, of abrasions, sloughings, and ulcerations of this tissue, either sparingly scattered, or aggregated, — the latter most frequently in the lower ilium, or near the termination of the ilium. These changes are most common in the parts of the membrane occupied with Peyer's and Brunner's glands, but they also occur in the mucous membrane itself. Their frequency in different parts of the canal in fevers is the same as stated in the article Digestive Canal (§ 36.). — These lesions are seldom seen alone. They are most frequently accompanied with changes in the mesenteric glands and in the encephalon, and are obviously advanced consequences of the general disease; as they are observed chiefly in the more protracted cases. They are the common causes of the intestinal hæmorrhages, of the severe pains, and the sinking, sometimes occurring in the latter stages.

52. *C. Alterations of the liver and spleen* are much less frequent in this country, than in warm climates, and the countries of the south of Europe. — *a.* The change in the liver consists chiefly of congestion, injection of its vessels, softening, and enlargement. — *b.* The *bile* seldom presents a healthy appearance, either in the gall-bladder or in the hepatic ducts. — *c.* The affection of the *spleen* is most common after the periodic fevers of miasmatous localities; and consists chiefly of great enlargement, softening, and even gangrene. — *d.* The *pancreas* and *kidneys* are not often altered in structure, and the *peritoneum* still more rarely, excepting in puerperal fevers, and after perforation of the digestive canal.

53. *D.* The *lesions of the respiratory and circulating organs* are frequently very important. — *a.* The *fauces* and *larynx* sometimes are covered by an aphthous exudation, or are œdematous, infiltrated, tumefied, and softened: but the larynx is seldom affected to the extent of impeding respiration, unless in eruptive fevers. — *b.* The *bronchial mucous membrane* is often injected in patches, of a dark red or livid hue, somewhat thickened and softened, and covered by a discoloured, viscid, and frothy mucus. — *c.* The *pulmonary parenchyma* is occasionally œdematous, or condensed by infiltration of a dark fluid, and at the same time somewhat softened. The changes in the bronchial surface and in the substance of the lungs often co-exist; and are also attended by gravitation of the fluids to the more depending parts of these organs; and by exudation of the more serous portions, — alterations which are not alone consequent upon death, but which often precede it, and constitute the "*Peripneumonie des Agonisans*" of Laennec. The changes, moreover, in the respiratory organs, particularly in the typhoid states of fevers, are often attended with lesions within the cranium and in the digestive mucous surface. — *d. Gangrene* of the lungs occurs only when inflammation of them supervenes in the course of fever; and the same remark is applicable to alterations of the *pleura* or *pericardium.* Inflammation of these latter textures sometimes takes place during convalescence, owing to premature exposure, and during the decline of fevers, particularly eruptive fevers. — *e.* The *heart* is sometimes softened, and its substance discoloured, particularly in adynamic or malignant fevers; and occasionally a sanguineous serum is found in the pericardium. — *f.* The blood in the cavities of the heart and large vessels is often also more or less changed. (See art. Blood, § 128.)

54. *E.* The *lesions within the head* most frequently consist of a morbid increase of the serous exhalation from the encephalic membranes, especially in the ventricles, and beneath the arachnoid; but the amount of the effusion is seldom very considerable. The blood-vessels within the cranium, especially of the pia mater and substance of the brain, are frequently turgid with a dark or fluid blood. Slight extravasations of blood are also rarely observed. These appearances have frequently little or no relation to the coma existing in the latter stages; and the same may be stated as to the changes in consistence which are sometimes seen in the substance of the brain, — these changes, however, being neither uniform nor frequent. —The *dura mater* is rarely affected.

55. *F.* Lesions are not so common in the *spinal chord* as within the head; but such as occur there are similar to these just stated. No uniform connection has been established between the morbid appearances in this situation and the pain in the back and loins, or other affections of the voluntary muscles, although some pathologists believe that these symptoms depend upon congestion or effusion within the spine.

56. Upon the whole, the changes observed in particular parts are chiefly advanced consequences of the disease, the most violent or malignant states of fever often being evinced rather in the altered colour, elasticity, and cohesion of the tissues, than in grosser lesions; these latter being most commonly superinduced on the former. It is important, however, to distinguish them from lesions which have existed before the occurrence of fever. The blood and all the secreted fluids are evidently more or less diseased; although it is difficult to show in what the change of these consists. (See Blood, § 115. and 128.)

57. VII. The Prognosis of *Fevers* is of the utmost importance as respects a knowledge of the changes taking place in their course, and of the

signs and tendency of these changes, as well as the reputation of the physician.—It is often difficult, owing to the mutability of the disease, and to the liability to err in appreciating those signs by which changes of the functions and of the organisation are indicated, particularly when the chief manifestations of life, as sensibility and organic contractility, are more or less impaired or perverted during the course of fever. The prognosis depends, generally, upon the following circumstances: — *a*. The nature and intensity of the predisposing exciting and concurring *causes*; — *b*. The character of the prevailing epidemic, or epidemic constitution; — *c*. The type, form, and state of the disease; — *d*. The states of the various functions, and of nervous and vital energy; — *e*. The congruity of the symptoms, and various contingent phenomena; — *f*. The influences, treatment, and regimen to which the patient is subjected;— and, *g*. The *entical* or other changes which may take place.

58. *A*.—*a*. The *predisposition* caused by debility, acute sensibility, or a plethoric and cachectic habit of body; a previously morbid, or congested state of the internal viscera, particularly of the liver, bowels, and spleen; and advanced age; increase the danger from fever. Some *epidemics*, however, most frequently attack the young and robust, and prove even more fatal to them. But, although *sporadic fever* may be also common in this class of patients, it is less dangerous in them than in the foregoing. — *b*. The *exciting agents*, particularly specific animal miasms; their concentrated form; the concurrence of several causes, either contemporaneously or in quick succession; their prolonged action, or continuance during the disease; and certain of the circumstances inducing unfavourable terminations (§ 48.); render the prognosis much more serious. Some importance should also be attached to the character of the prevailing epidemic, as respects its open or insidious form, and the effects following a treatment appropriate to the usual states of the disease.

59. *B*.—*a*. The intermittent *type* is less serious than the remittent, and this latter than the continued; but the more the fever is inclined to change, to become irregular, or to pass into one of a graver character, the more serious it is. The more complete the intermission, or the remission, so much less is the danger; and the more disposed continued fevers are to evince a remitting form, the more favourable is the circumstance. The longer fever has continued, the more difficult will be the cure; and relapses are more unfavourable than first attacks.— *b*. The inflammatory and sthenic *species* are much more generally favourable than the adynamic forms. — *c*. The *simpler* the fever, the more certainly will recoverytake place; and the more *complicated*, the greater is the danger. The adynamic *form*, with *predominant affection*, of an important internal organ, especially the intestinal mucous surface, or the brain, or the lungs, is accordingly amongst the most dangerous; more especially if the vascular system and circulating fluids, or the soft solids, also become vitiated.

60. *C*. The *more that the organic nervous influence* is suppressed, diminished, or disordered throughout the different viscera, the more unfavourable should be the prognosis; the functions of the viscera, the state of the fluids and secretions, and the appearance of the soft solids, evincing the extent of the disorder and of the danger. — A weak, small, and quick pulse; a dark, dry, and contracted tongue; profuse, offensive, viscid, and unnatural perspirations; watery, fœtid, flaky, membraniform, and unhealthy stools; discoloured, scanty, and brown urine; livid or discoloured nails, fingers, eyelids, lips, and nose, independently of the cold stage; a discoloured, dark, and dry mouth and throat; and an offensive and penetrating odour proceeding from the patient; — are dangerous symptoms. A pulse of 120 or upwards, unless in the puerperal state, is unfavourable, and so much the more so as it is above this number. A brown or black coating, and deep, reddish fissures, or a dark or livid colour of the tongue; stridor of the teeth; a movement of the lips and lower jaw as if eating; firm closure of the jaws and lips; extreme anxiety at the præcordia; tumefaction, tenderness, or pain of the epigastrium, hypochondria, or abdomen generally; tympanitic or flatulent distension of the abdomen; copious or repeated discharges of blood by stool; a sudden irruption of the catamenia, and an equally sudden disappearance of them; a moaning, weak, quick, abdominal, or gasping respiration; coldness or rawness of the expired air; hiccup; excessive increase, or diminution, or irregular distribution, and otherwise morbid state, of the animal heat; sunk features; rapid emaciation; great difficulty or impossibility of acting upon the skin by sinapisms or blisters; an earthy, or deadened, unnatural, lurid appearance of the external surface; yellowishness of, or petechiæ and livid or purple blotches on, the skin; and dark mucous sordes on the lips or gums, or sanious discharges from the latter or from the nose; —are very unfavourable circumstances.

61. *D*. The unfavourable symptoms, more directly depending upon the *cerebro-spinal nervous system*, are — *a*. extreme pain of the head; excessive sensibility or depression of spirits; tumid or red countenance, injected watery eyes, contracted brows, &c., quickly passing into delirium, sopor, or coma; prolonged watchfulness, or early somnolency or torpor; convulsive movements, trismus or spasms of parts, great restlessness, and continued tossings; despair of recovery; and a presentiment or feeling that death will ensue: — *b*. And still more unfavourable are, early mental indifference, particularly to the issue of the disease; insensibility or sopor; profound coma, and difficulty of being roused; relaxation of the sphincters, and unconscious evacuations; excessive loss of muscular power; inability to retain any other than the supine posture, especially early in the disease, and in connection with extreme pain in the back and loins; falling down towards the foot of the bed; a position of the limbs and body, depending upon their gravity, and different from that usually preferred by the patient; inability to assume a posture different from that in which he is placed; picking with the fingers at the bedclothes; subsultus of the tendons; catching after objects in the air; alternate dilatations and contractions of the nostrils during respiration; loss of voice or speech; trembling of the tongue, or inability to protrude it; an open mouth or relaxation of the lower jaw; difficulty of deglutition; and dilatation and insensibility of the pupil.

62. *E. Unusual or incongruous symptoms* also denote danger, especially if the patient is more depressed by, or sinks faster under, the disease, than its apparent severity should warrant. The presence of severe symptoms, of which he makes little or no complaint, is much more dangerous than restlessness and anxiety when the symptoms are not so severe. Unquenchable thirst, the tongue being moist, and febrile heat moderate, the absence of thirst, the tongue and mouth being dry, and the temperature high; and remarkable craving for food before remission of the symptoms, the tongue remaining dry, &c.;—are unfavourable symptoms; the first indicating dangerous lesions of the stomach and liver, the second oppression of the brain, and the third inflammatory action of its substance, with extreme debility. — An early collapse of the countenance, or a pale lurid hue of it, with rapid emaciation, indicates a very dangerous form of fever, with vitiation of the circulating fluids. The more complete the change in the expressions, appearance, and habits of the patient, during the early stages of the disease, the greater the danger. A remarkable acuteness of the senses of hearing and sight is more unfavourable than an opposite condition. Changeableness of the urine, especially if it becomes limpid and scanty, from being copious and turbid, or ceases to deposit a sediment; an unnatural sound on deglutition; a marked or unusual sinking, or protrusion of the eye; a diminution or an enlargement of the objects seen, or double vision; openness of the eyes during sleep, or sopor; the patient supposing himself in a different bed or house to his own; and his urging a removal to his friends, or to a church, or to the altar; — all denote danger.

63. *F.* The more mild, open, and uncomplicated the disease, or devoid of any of the above unfavourable signs, the more certain will be recovery. The *occurrence of crises* at due periods, and their spontaneous and full evolution, are also very auspicious. But if the critical evacuations are imperfect, or if the exacerbations, or aggravation of particular symptoms, usually preceding them, only are observed — the efforts being thus abortive — or if the disease afterwards become more severe, danger should be apprehended; especially if the tongue be drier, the secretions more disordered or suppressed, and organic nervous power further diminished after such attempts. (See art. Crisis.)

64. VIII. Causes. — i. Remote. — *A. The predisposing causes* are not the same in all fevers; for there is a certain susceptibility of frame, which favours the action of the exciting causes of epidemic and of certain specifically infectious fevers, independent of the states that predispose to the sporadic occurrence of fever. There seems also to be a certain innate susceptibility to the infection of eruptive and yellow fevers, that is destroyed by an attack of the disease, the same infection not producing its specific effects a second time; and this susceptibility, particularly when yellow fever is epidemic, is generally connected with high irritability of the muscular system, vascular plethora, and a robust state of the frame. — The most influential of the predisposing causes are — dread of the disease; change from a cold to a warm climate; peculiar idiosyncrasy; acute sensibility and irritability; the excessive use of food, especially animal food, and of spirits, wines, and malt liquors; moist states of the air and diminished electricity; prevailing winds from the south and east; fatigue and exhaustion of mind or body, from whatever cause; accumulations of bile on the biliary apparatus, and morbid colluvies in the prima via; insufficient and unwholesome food; a close and moist atmosphere; whatever lowers the moral and vital energies; and the general predisposing causes adduced in the article Disease (§ 30—38.).

65. *B. The exciting causes* are the preceding, particularly when several act contemporaneously, or with much intensity; as a moist, warm, and stagnant air, rapidly carrying off by induction the positive electricity of the frame; a saburral state of the prima via; accumulations of vitiated bile; and mental or bodily exhaustion; miasmata, terrestrial exhalations, and foreign gases floating in the air; emanations from decaying vegetable matter; the exhalations from crowds of persons or animals in a confined space and stagnant air, as in transports, camps, crowded barracks, prisons, &c.; the effluvia arising from putrid or decaying animal matter, particularly when concentrated, or mixed with the emanations from decomposed vegetable matters; the miasms generated by copious secretions and discharges from the sick, as in crowded wards of hospitals, particularly lying-in hospitals, close, crowded, and low apartments, &c.; effluvia specifically infectious, as those of typhus and scarlatina; the force of imagination, or the impression produced on the mind by the sight of a person in the disease; fear, dread, or terror, and any of the depressing passions acting long and energetically; remarkable exertion of mind and body, and consequent fatigue of either or both; defect of the natural or accustomed stimuli, as of food, drink, tobacco, opium, &c. Certain of the causes, as infectious effluvia, miasms, &c., are especially active, and may therefore be said to be the *specific*, *efficient*, or *essential agents* of the disease; whilst others, as fatigue, cold, defect of stimuli, and certain of the predisposing causes, may act merely concurrently, or consecutively, as respects the principal exciting agent, or in such a manner as to determine or aid its effects. I would refer the reader to what is advanced respecting the specific and determining agents and influences in the articles on the *Causation of* Disease (§ 55—63.), on Endemic Influences, and on Infection.

66. ii. Of the Proximate Cause, *or those Changes more immediately consequent on the exciting or efficient Agents of Fever. — A. Opinions of the ancients, and of former writers.* — Fevers have been considered as essential or distinct diseases from the earliest records of medicine; and the extent of the ravages then produced by them may be inferred from the circumstance of a separate divinity having been assigned to them in the Grecian and Roman mythology. The Greeks invoked their divinity by the appropriate name Πυρετὸς; the Romans by the appellation *Febris* (Pliny, l. ii. cap. 7.; et Ælian, *Var. Hist.* l. xii. cap. 11. p. 566.). The latter even erected temples for her worship on the Palatine Mount, in the Via Longa (*Vico Longo*), and in the place of the Monument of Marius (Valerius Maximus, l. ii. cap. 5. p. 55.). — The popular

dread which gave rise to such a medium or mode of deprecation* not only marks the destructive prevalence of fevers in these countries, but also indicates the noxious effects of the Pontine Marshes in the time of the Roman republic.

67. The earliest opinion of the ancient Greeks respecting the immediate cause of fever appears to have been that of ANAXAGORAS (PLUTARCH, *in Vitâ* PERICLIS, p. 155.: etiam ARISTOTLE, *De Gener. Anim.* l. iii. cap. 6.) — the contemporary of HIPPOCRATES. He attributed all acute diseases to an abundance of bile. ARISTOTLE (*De Part. Animal.* l. iv. c. 2.) combated this doctrine; but it became prevalent nevertheless. HIPPOCRATES, instead of entering into speculations which the want of data and first principles rendered futile, set a better example, by directing attention to the varying phenomena of the disease, and to their relation with the vicissitudes of season, &c. PLATO (TIMÆUS, p. 497.; et GALEN, *De Dogmat. Hipp. et Plat.* l. viii. p. 324.) considered that fevers, and, indeed, all diseases, arose from a disproportion of the different physical elements which enter into the composition of the body. Continued fevers, he supposed to arise from superfluity of fire; a quotidian from abundance of air; a tertian from predominance of water; and a quartan from that of earth. This is, perhaps, the first attempt at explaining the types of fever. It appears to have had but little influence, notwithstanding its universal adoption, in changing the modes of practice already recommended by HIPPOCRATES.

68. The *dogmatists* (GALEN, *de Nat. Hum.* p. 279.) of the following age, in conformity with their doctrine, conceived fever to proceed from the abundance of bile, its quantity determining the type of the disease. The *maximum*, in their opinion, produced continued fever of an ardent character; a less quantity, quotidians; and the *minimum*, quartans. PRAXAGORAS (RUFFUS, lib. i. chap. 33. p. 109.) of Cos, one of the most faithful followers of Hippocrates, adopted a similar theory, and endeavoured also to account for the cold stage of the disease, by supposing its source to exist in the vena cava. This opinion possesses some features of the more modern doctrine of congestion, which no doubt exists, both in the vena cava and other large veins, during the cold stage, as a part of the series constituting the diseased actions which obtain the name of fever. ERASISTRATUS was the first who contended for a connection between fever and inflammation (GALEN, *Comment. II. in L. de Nat. Human.* p. 27.). He conceived these morbid states to consist in a transfusion of the blood into the arteries, disturbing the spirit they contain, and giving it an irregular direction. The former he believed to arise from the presence of blood in the large arteries; the latter, from a congestion (παρέμπτωσις) of this fluid in the capillaries (*Ibid. de Venæsect. adv. Erasist.* p. 2.). He was equally averse from bleeding and purging, which had been long and generally in use in the treatment of these maladies; and in conformity, as he supposed, with his theory, recommended spare diet, emetics, lavements, warm baths, frictions, &c. (*Ibid.* p. 15, 16.)

69. ASCLEPIADES, the founder of the *Methodic School*, adopted a great part of the doctrine of ERASISTRATUS respecting the fundamental corpuscles, and the *pneuma* or spirit of the dogmatists. He explained the heat which takes place in fever, by the motion of these corpuscles; and accounted for sensation, pain, &c. by a similar hypothesis (CŒLIUS AURELIANUS, l. i. c. 15. pp. 46. 48. 57.). According to him, fever consists in an increase of heat, and of the pulse (*Ibid.* l. ii. c. 33. p. 151.). The other phenomena of fever and of inflammation, he considered to proceed from a disproportion between the particles and their pores. The elementary corpuscles, he supposed to pass from the lungs into the heart and arteries, and to produce occasionally, during their volatilization from the body, an obstruction in the channels through which they circulate; the larger causing the most obstinate obstruction, and, consecutively, the most violent fevers; and the lesser, slighter attacks. The type of the disease was explained after the same manner. The longer the intervals between the febrile accession, the more subtile the atoms were supposed to be which had become impacted in the vascular pores (*Idem, Acut.* l. i. c. 13. p. 42.). ASCLEPIADES conceived that nature could do nothing of herself in removing this state, and that all must be attempted by the physician. CELSUS (lib. iii. c. 8. p. 469.) informs us, that "Asclepiades officium medici esse dicit, ut tuto, ut celeriter, ut jucundè curet." Agreeably to this maxim, he prescribed gentle medicines, and dietetic means, instead of the violent remedies of the empirics (CŒL. AUREL. *Acut.* l. i. c. 14. p. 44.). Enemata, bloodletting, dry cupping, frictions, gestation, exercise, bathing, and, more rarely, emetics, were the agents which he recommended. (PLINY, lib. xxvi. c. 3. p. 392.; CŒL. AUREL. l. c. et lib. iii. c. 8. p. 215.)

70. SORANUS (CŒL. AUREL. *Acut.* l. ii. c. 33. p. 153.) conceived fevers to consist in an absolute relaxation of the vessels and their pores. CASSIUS, the Eclectic (CASSII *Iatrosophistæ, Naturales et Medicinales Quæstiones*, ed. CONR. GESSNER TIGUR. 1562.), was of opinion, conformably with the chief doctrine of the Methodics, that they arise in consequence of a different arrangement taking place in the primary and invisible corpuscles; while he adopted the hypothesis of the more ancient dogmatist, by considering the increase in the temperature to be the result of friction between these particles, disengaging their integral heat. The views of fever adopted by the Eclectics, led to few modes of practice which had not been previously employed. HERODOTUS (ORIBASIUS, *Collect.* l. vi. cap. 28. p. 228. *et passim*), the disciple of AGATHINUS, who embraced more of the pneumatic system than of any other, placed great confidence in warm bathing and in sudorifics. These he considered to be serviceable, by fortifying the *pneuma* or spirit, and assisting it to expel heterogeneous particles. He attempted, also, to determine, with more precision, the time and circumstances in which bleeding, as recommended by HIPPOCRATES, ought to be prescribed.

71. GALEN (*De differ. Feb.* lib. i. *passim*) attri-

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* The following is from a votive tablet to the goddess: —

Febri . divæ . Febri .
sanctæ . Febri . magnæ .
Camilla . Amata . pro .
filio . male . affecto . p .

TOMMASINI, in GRÆVIUS, Thesaur. Roman. Antiq. t. xii. p. 867.

buted the varieties of fever to a degeneration or putrefaction of the humours, and to a certain change in the pneuma, developing an unnatural degree of heat. He supposed the heart and arteries to participate consecutively in this derangement, and to produce the subsequent phenomena. Continued fevers, according to him, had their chief source in an alteration of the pneuma, and of the humours; quotidians in a degeneration of the mucus; tertians in a similar change of the yellow bile; and quartans in a putrefaction of the black bile, which he considered the most slowly moved, and to require the longest period for the production of the paroxysm. The doctrine of Galen continued to be almost implicitly and universally adopted for many ages; and even down to modern times, it has had its partisans. The writers in medicine who flourished during the decay of the Roman empire, and the Arabian physicians, introduced but few modifications of his theory.

72. Aëtius (*Tetrabibl. II.* serm. ii. cap. 54. *et passim*) and Palladius explained the phenomena of fever in a nearly similar manner to Galen. The former paid particular attention to the good effects arising from cool apartments, and ventilation, during treatment; and employed the therapeutical means recommended by Hippocrates and Galen. While Palladius (*De Febribus*, cap. 9. p. 30.) admitted the opinion respecting the degeneration of the humours, he considered the disease to arise, also, from other causes — such as external or internal irritations, engorgement or suppression of the secretions and transpirations, and putrefaction of the blood itself.

73. During the seventh and eighth centuries, the Arabians attributed fevers to superabundance of impure or thick blood, which they conceived to be connected with a similar state of the bile, and other humours. They pretended, although not very appropriately, to dilute the former by purging, and to evacuate the latter by bleeding. Aaron of Alexandria, and Rhases (*Contin.* lib. xvii. cap. 6. sect. 360. *et passim*), introduced no change into the humoral pathology. They, however, determined with more accuracy the types of continued fever; and paid greater attention to their production, especially in an epidemic form, by the influence of seasons and of certain states of the atmosphere, than had been bestowed upon the subject since the time of Hippocrates. Ali (*Abulfarg. Hist. Dynast.* p. 326.), surnamed the Wise, a physician of the tenth century, deserves notice, more from his recommendation of emetics, as prophylactics against that state of the humours which he supposed to be productive of fever, and on account of his employment of bleeding in intermittents, than from any innovation which he made in the received theory. Avicenna (Sprengel, *Hist. Med.* vol. ii. p. 358.) appears to have introduced the greatest change in the doctrine of Galen of any of the Arabian writers. He attributed the phenomena of fever, and other acute diseases, more to a superabundance of the different humours, than to a degeneration of their constitution. Gilbert[*], an English physician, in the middle of the thirteenth century, entertained the opinion, that as the changes which supervene in the humours are infinite, so the phenomena of fevers may be equally various. He defined fever to be a greater heat than natural, developed by the heart, and propagated by means of the arteries throughout the body, which deranges the other functions in its course, and promotes the further degeneration of the humours which first gave it origin. He admitted, that the heat of the body was not materially increased in many cases, and not at all in others; and that his definition was consequently incomplete. He, however, endeavoured to get rid of the difficulty by involving it in a cloud of scholastic subtleties.

74. Arnald of Villanova (*Breviar.* lib. i. cap. 26. p. 1121. *et passim*) introduced astrology into the doctrine of fever, by attributing derangements of the humours to the influence of the heavenly bodies. Mengho Bianchelli (*De Omni Gen. Febr. et Ægritud.* Venet. 1536, fol. — *a rare work*), an Italian physician of the fifteenth century, gave a similar definition and theory of fevers to that already given by Gilbert. Michel Savonarola (*Practica Canonica de Febribus*, cap. ix. f. 36.), a professor at Ferrara, about the same period, deserves mention on account of the view which he took of the influence of climate in modifying the pathology and phenomena of fever. There are few other authors who wrote during the middle ages, deserving of notice. All of them either more or less implicitly adopted the doctrine of Galen, or mixed it up with a farrago of scholastic subtleties and astronomical suppositions.

75. The removal of the trammels of the schools, and the revival of medical science in Europe, may be dated from the writings of J. Fernelius (*Opera Pathologica, &c.* sec. iv.). This eminent author and H. Augenius (*De Febribus*, sec. ii. c. 4. p. 50.) were the first to impute the proximate cause of fever to changes in the living solids. They denied that the fluids constituted any part of the organisation, and consequently inferred that their influence in the production of the disease could not be primary. They very justly, however, admitted their consecutive derangement. Felix Plater (*Praxis Medica*, vol. ii. c. 2. p. 39.), one of the first writers who, since the revival of learning, turned attention to the true source of medical science — accurate and intimate observation — stated that, when the sensibility of a part is disordered by an excessive increase of its animal heat, the result is fever, the type of which he conceived to depend upon the particular fluid which is affected. He believed that, when the fluids contained in the vessels of the mesentery are disordered, fever assumes an intermittent type; and that the further the part whose sensibility is affected, is removed from the heart, the longer is the fever in being produced. Enough,

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[*] Gilberti *Anglici Compendium Medicinæ, tam Morborum Universalium, quam Particularium, non solum Medicis, sed et Chyrurgicis utilissimum*, edit. Mich. Venet. de Capella, 1510, 4to. This production of our countryman is curious, on account not only of its medical but also of its metaphysical and dialectic character. The following proposition, which he states, and immediately endeavours to solve, considered in relation to the time at which it was written, deserves transcription, and evinces also the metaphysical partialities of the author. "Wherefore is the vegetating or vital principle destroyed at death, and not the intellectual? Because the vegetating or vital principle is derived from matter, and may be regarded as its simple product. Consequently it must necessarily cease to exist with the derangement and destruction of the materials which produce it. The intellectual principle, on the contrary, is not a simple form; it possesses different attributes, not derived from the materials of the body, and therefore must endure after death." (Fol. 245, 246.)

however, has been stated to show that his facts are more valuable than his doctrine.

76. THOMAS CAMPANELLA *, the celebrated Italian metaphysician and pathologist of the sixteenth century, discarding the opinions of ARISTOTLE, conceived that the vital spirit, which is produced from the most subtile of the animal humours, and is nourished by the blood, is concerned in the production of all diseases, although itself undergoes no change, being only irritated or excited by the aëriform matters and flatuosities contained in, or proceeding from, the fluids. He considered that, as respects its nature, fever can scarcely be called a disease, since it results from the reaction or the efforts of the vital spirit to resist vitiation and putrefaction of the fluids, and thus to preserve life. He attributed the crisis and critical days to lunar influence, and explained the action of remedies on the principle of their exciting or reducing the temperature of the body. VAN HELMONT (*De Febribus*, c. 16. p. 783.) ascribed fever to the influence of the archeus or vital principle.—Although the foundation of the doctrine, which afterwards became so generally adopted, owing to the form it assumed in the hands of HOFFMANN, CULLEN, and others, was laid by these writers, another theory was soon afterwards promulgated. Owing to the increasing enthusiasm with which chemistry then began to be cultivated, the *chemical pathology* first proposed by PARACELSUS (*Op. Omnia Med. Chemico-Chirurg.* 4to. Basil. 1589.), and supported by SYLVIUS (*Op. Med.* 4to. Amst. 1679.), WILLIS (*Oper. Omnia*, 4to. Geneva, 1680.), KERGER, BORELLI (*De Motu Animal.* pars i. et ii.), WEDEL (*Physiol. Med. et Pathol.* 4to. Jenæ, 1679.), and others, obtained a very general support; and although all the phenomena of these diseases were not explained by some according to the principles of this school, yet its doctrines were conveniently adduced to account for various states of disorder.

77. It is unnecessary to notice the dreamings of FLUDD, DIGBY, MAXWELL, GREATRAKE, and others, of the sect of the Rosicrucians, which appeared early in the seventeenth century, as to the nature of fever. It is impossible to cast even a glance at the ravings of this sect, without entertaining ideas the most humiliating of human nature and intellect. Yet they found followers in Europe, particularly in Germany, as late as the middle of the eighteenth century; and, even now, emanations of their doctrine may be traced in some of the reveries which have recently been promulgated in that enquiring country. Leaving opinions calculated only to excite the most humiliating suggestions respecting the extent of human knowledge, and equally abasing reflexions on the state of medical science in this country at that epoch, we arrive at a period presenting opinions more in accordance with calm and unbiassed reason than those immediately preceding.

78. The writings of SYDENHAM (*Opera Omnia*, Leyd. 1742, 8vo. *best edition*) tended to dissipate the "thick-coming fancies" of the humoral and chemical pathologists; and, although tinctured by the chemical hypothesis, he nevertheless directed attention to the operations of nature. BAGLIVI (*Op. Omnia*, Ven. 1716, 4to.), at a later period, trod nearly in the same path as SYDENHAM; and, like him, attended to the prevailing character of epidemics, and viewed their phenomena in connection with the seasons and atmospherical vicissitudes. STAHL (*Theoria Med. Vera*, 4to. Matæ, 1737.), the disciple of WEDEL, forsaking the doctrines of his master, adopted a theory in many respects similar to that proposed by VAN HELMONT (*Op. Omnia*. Amst. 4to. 1664.) and CAMPANELLA. The psychico-chemical, or bio-chemical, hypothesis of STAHL subsequently received the support of SAUVAGES (*Nosol. Method.* 2 vols. 4to. Amst. 1768.), who, in addition to the efforts of the anima, the increased motion of the fluids, and augmented secretion and excretion of the salino-sulphureous particles, added the doctrine of BOERHAAVE, of accelerated circulation to remove a mechanical obstacle.

79. Although recent opinions as to the proximate cause of fever may be traced partly to FERNELIUS and others, yet it is to HOFFMANN (*De Generat. Febr.* Halæ, 1715.), the cotemporary of STAHL, that we are indebted for some excellent ideas. He placed the chief source of motion in the nervous system, and considered that certain affections of nervous influence induce a general spasm of the extreme vessels, driving the blood from the capillaries into the large vessels, the heart and large arteries thus becoming irritated. A nearly similar hypothesis was soon afterwards framed by BOERHAAVE (*Prælect. Acad.* 2 vols. Goet. 1744.) from opinions entertained at different periods, more particularly from some of those promulgated by HOFFMANN. BOERHAAVE, adopting no single nor general principle, to which alone he referred the different manifestations of fever, kept his attention more especially fixed upon the relation subsisting between the exciting causes, and the actions they induce in the system, explaining at the same time the latter conformably with the pathological doctrines of the time. He considered that a quicker and a stronger action of the heart was induced, during fever, by an accession of the influence of the brain and the cerebellum, in order to overcome the resistance offered by the smaller vessels; and that fever was therefore an exertion of life to avert death. CULLEN (*First Lines of Pract. of Phys.* vol. i. p. 42.) illustrated, in a much more satisfactory manner, the doctrine of the living solid, as first proposed by FERNELIUS, and so ably extended, and, indeed, established, by HOFFMANN. The application of it to the theory of fever, which had been made by these and other writers, was more precisely explained by CULLEN, and more conformably with many of the phenomena. The opinions of this very acute and philosophical physician held a stricter reference to the early changes than had been generally entertained. The causes of fever he supposed to act by debilitating the nervous energy, inducing diminished influence of the brain, and consecutive atony of the superficial capillaries, accompanied with spasm; reaction of the heart and larger arteries supervening in consequence of this state. This doctrine was farther illustrated and modified by CURRIE (*Medi-*

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* Born in 1568, and imprisoned for his metaphysical opinions from 1599 to 1629, when he was set at liberty by Pope URBAN VII. He afterwards went to Paris, where he died in 1639. (TIRABOSCHI, *Storia, &c.* t. vii. p. 140.; CAMPANELLA, *Metaphys.* l. ii. p. 39.; et *Medecin.* l. i. c. i. art. 1—4. 8vo. Leyd. 1635.)

cal Reports, &c. Lond. 1805, *passim*), Gregory (*Lectures, &c.*), and W. Philip (*On the Nature of Fever.* Edin. 1807, p. 89.), the last of whom ascribed febrile reaction to a contest between the capillary and larger vessels; and it was most conducive to the employment of emetics at the commencement, and of diaphoretics through the course of the disease. Amongst the other neuropathologists, Selle (*Rud. Pyretologiæ Methodicæ.* Berol. 1768, 8vo.) and Tode (*De Febrium Indole.* Hafn. 1769.) deserve notice. The former imputed fever to a peculiar condition induced in the nervous system in general; the latter referred it to a certain irritation in the common sensorium. Schäffer (*Versuche*, ii. p. 44. *et seq.*) and Thorer (*De Actione Systematis Nervosi in Feb.* Gott. 1774, p. 257.) ascribed it to a similar state of the nerves.

80. The experiments and arguments of Haller having tended to establish irritability as a principle inherent in the muscular fibre, and independent of the cerebro-nervous system, furnished materials for doctrines founded upon such views. Several modifications of these successively appeared. Stoll (*Aphor. de Febribus*, p. 208.; et *Rat. Med.* vol. i. et ii. Vindob. 1768, 8vo.) considered fever to be morbidly increased irritability of the heart; J. C. Juncker (*De Spasmo Febrili Dissert.* Hal. 1769.) viewed it as augmented irritability of the heart and arteries, the nervous influence being, at the same time, diminished; Elsner (*Varius Febris Status, Regium.* 1789, Dœring. I. p. 110.) imagined it to be an irregular distribution of the irritability in consequence of certain internal stimuli; and Doser (*De Febre.* Wirceb. 1795, p. 17.) ascribed it to a similar condition of this principle, the irritability of involuntary organs being heightened, and that of the voluntary lessened. Other pathologists called in the vital influence, in a more particular manner than had heretofore been done, in order to explain the phenomenon under consideration. Kramp (*Fieberlehre nach Mechanischen Grundsätzen.* Heidelb. 1794.; et *De Vi vitali Arteriarum Diatribo.* Argent. 1786, p. 411.) referred fevers to an increase of the vital force of the vessels, beyond that which is requisite to the natural circulation of their fluids. Fordyce (*Dissert. on Fever, passim*) imputed them to efforts made to overcome obstacles opposing a free and healthy circulation; and Reil (*Memorab. Clinic. &c.* fasc. iv. p. 107.) conceived them to result from an exalted state of the vital influence affecting chiefly the heart and blood-vessels. Along with this state of the vital energy, he supposed its disposition and qualities to be changed in the different kinds of contagious fevers; and hence the alterations which supervene in the constitution of the secretions, &c. Sprengel (Galen's *Fieberlehre.* Bresl. 1788, 8vo.) and C. F. Hufeland (*System der Pract. Heilk.* Jen. 1802.) acknowledged, as the proximate cause of fever, a morbid reaction of the vital influence, which they imagined to take place throughout the system.

81. The doctrine of Brown (*Elementa Medicinæ.* Edin. 1780, 8vo.) was remarkable chiefly for the manner in which the vital phenomena were explained by it. In this respect, also, the opinions of his contemporary Darwin (*Zoonomia*, vol. iv. p. 333.) were no less distinguished, although greatly inferior to those of Brown in point of originality, simplicity, and philosophical sagacity. Brown considered life to be preserved by the operation of the exciting fluids on the excitable solids, and health to be the result of their equable and reciprocal action. This action he considered to be deranged by the causes productive of disease. Fever he supposed to be an asthenic state of the system, arising either from the abstraction of the natural stimuli, or from the causes of the disease having directly or indirectly exhausted the excitability. The notions of Darwin were merely more involved modifications and illustrations in different terms of the same theory. From these have arisen the new Italian doctrine, which attributes an opposite state of the system to fever from that imputed to it by Brown. The opinions concerning the nature of disease, and the action of remedies, introduced by Rasori (*Della Febre Petecchiale di Genova; Del Metodo di Curare, &c. del Prof.* G. Tommasini. Bologna, 1821, &c. &c.), have produced so great a revolution in the principles of his master, as to entitle him to the honour of being considered as the founder of a new school.

82. The ideas of the humoral pathologists have been lately revived in Germany by Ch. L. Hoffmann (Hildenbrand, *Institutiones Medicæ*, vol. i. p. 93.), Wedekind (*Nachrichten über das Französische, &c.* Leips. 1797, 8vo.), and Herzig (*De Febribus in Genere.* Colon. 1790, 8vo.). They suppose some change analogous to putrefaction to supervene in the blood, which, irritating the vessels, produces fever. At a still later period, the opinions of the bio-chemists have been attempted to be restored. J. C. Stark and G. F. Parrot (Hildenbrand, l. c.; and Hufeland's *Journal, passim*) attributed the proximate cause of the disease to an excitation and disturbance of the calorific process, and to the abundance of carbon in the blood. G. C. Reich (*Von Fieber und dessen Behandlung.* Berl. 1800, 8vo.) assigned a defect of oxygen in the organisation as the cause; J. C. Bährens (*Uber Fieber und Saulzsäure.* Leip. 1802.) imputed too great an abundance of this substance to the system during fever; and J. C. Harles (*Neue Untersuch. über das Fieber.* Leip. 1803.) referred the whole phenomena to the agency of electricity.

83. Although fever and local inflammation may arise simultaneously from concurrent predisposing and exciting causes, or from epidemic influence, yet the identity of both diseases did not become an article of pathological belief, until towards the close of the last century. Riverius (*Prax. Med.* sec. xvii. c. 2.), indeed, had very justly stated, that acute and malignant fevers very rarely run their course without inflammation of some viscus: but he remarks, in a manner worthy his high reputation, that the superinduced inflammation is different from that which is primary or idiopathic. Other writers had conceived, from the predominance and character of certain symptoms occurring in the progress of fever, that inflammatory action is no infrequent attendant upon it. Coiter, of Groningen, was surprised when he found no inflammatory appearances within the head, in cases where the cerebral symptoms were very remarkable; — and Willis long afterwards supposed fever to be an inflammation of the spirits (*spirituum phlogosis*). Dr. Grandvilliers is, however, the first writer, who

has distinctly ascribed fever to inflammation of the brain, he having remarked, in 1757, this organ especially affected in an epidemic characterised by malignant symptoms; and Dr. WENDELSTADT, in his description of an epidemic that prevailed in 1794 and 1795 in Wetzlar, attended by delirium in some cases, by catarrh or pneumonia in others, or by both delirium and pneumonia, considered inflammation of the brain to have occurred from the commencement. Still the existence of essential fever cannot be said to have been called in question, until the appearance of the works of PLOUCQUET (*Exposit. Nosolog. Typhi.* Tubing. 1800.) and CLUTTERBUCK (*Inquiry into the Seat and Nature of Fever.* Lond. 1802.), in which this disease is ascribed to inflammation of the substance of the brain. This doctrine was soon afterwards controverted by Dr. BEDDOES (*Researches concern. Fever as connected with Inflam. &c.* 8vo.); but MARCUS, of Bohemia, forsaking the pathology of BROWN, became a convert to it, and its most zealous supporter (*Ephemer. der Heilk.* b. i. st. 2. &c. 1809.); and other writers of inferior note espoused the doctrine both in MARCUS's *Ephemerides* and in HORN's *Archives*.

84. Shortly afterwards, another theory of fever made its appearance; and in France, at least, attracted considerable attention, owing to the copious writings of BROUSSAIS and of his pupils. This pathologist maintained that the mucous membrane of the digestive canal is the primary seat of fever, and presents the most general and unequivocal lesions after death; affections of other organs being merely consequent upon, or sympathetic of, disease of this part. Although several writers, especially RAHN (*Briefwechsel, &c.* p. 250. Zurich, 1787.), and BEDDOES (*Op. cit.* p. 63.), considered the gastric system most frequently affected in fevers, it was reserved for BROUSSAIS to conclude that "all the essential fevers of authors are to be ascribed to gastro-enteritis, simple or complicated." (*Exam. des Doct. Med. &c.* t. i. p. 34.)

85. These two theories are the most important of those which have had reference to the local origin and seat of fever. They are manifestly founded on narrow views of the deranged actions consequent upon prolonged mental depression and anxiety — upon change of climate, season, and weather — upon the operations of endemic agents and epidemic influences — upon the action of various infectious miasms — according as each or several of them may affect persons differently predisposed, by temperament or diathesis — by habit of body and constitutional energy — by the state of the secreting and excreting viscera — and by the circumstances in which they are placed. They appear also to be deduced from mistaken conceptions of the actual sequence of the disordered actions characterising the various species of fever — sporadic, endemic, epidemic, infectious, &c. — however they may be associated or complicated with more or less local disease, either at their commencement, or in their progress.

86. The opinions which have recently been most adopted on the Continent, especially in Germany, are those which were taught by J. P. FRANK (*De Curandis Hom. Morbis, &c.* t. i. p. 34.) and V. N. ab HILDENBRAND (*Institut. Pract. Med.* t. i. p. 96.). The former of these writers confesses that he despairs of conveying any exact idea, or even of coming to any satisfactory conclusion, respecting the proximate cause of fever. He thinks, however, that fever may be viewed as resulting from irritation induced by an unaccustomed stimulus, the powers of life reacting, or making efforts at reaction, in order to remove it. HILDENBRAND states nearly the same proposition in different words, in concluding that the cause of fever is to be found in a morbidly increased reaction of the vital forces, owing to the irritation of a morbific stimulus. He further remarks — 1st, That all fevers are caused by an absolute or relative irritation, and consequently that they are all at their commencement irritative; — 2dly, That the reaction of fever never follows mere debility, although it is attended by debility; and that the debility of the vital powers is always secondary and the effect of the morbid irritation, or, adventitious as in the progress of the disease. — Admitting that it is difficult to explain — although I think it quite possible — how reaction of the vital forces can take place in the system in consequence of a cause primarily producing debility, more especially in the part where the impression is primarily made; still it is evident that all the causes of fever are not positive stimuli or irritants in their primary action, and consequently that their immediate effects on the surface to which they are applied are not exciting. Indeed, we have no evidence that the effects which are proximately consequent upon their application, are similar to those which uniformly result from those stimuli, with the action of which we are acquainted. Stimulating effects undoubtedly follow, remotely, in a majority of instances, but they supervene in consequence of intermediate operations taking place in the system itself.

87. The opinions of Dr. JACKSON are not materially different from those of HILDENBRAND. He considers the material cause of fever to be of an irritative kind; — that it enters the body by the absorbents of the first passages, proceeding into the circulation; and that it produces the febrile act by irritating the extreme series of organic capillaries, thereby occasioning subversion of the existing mode of action, and giving rise to changed or unnatural forms of action, through which the different secretions and functions are diminished, increased, or modified, in various ways and degrees.

88. I am not aware that any opinion has been promulgated different from those now briefly stated, up to the period when my own views as to the pathology of fever were published. Dr. ARMSTRONG was the most copious and recent writer on fever at that period; but, after an attentive perusal of his work on typhus, and of his published lectures, I am unable to ascertain what his views are, or wherein they differ from those generally entertained at the time, especially from those previously published by Dr. JACKSON, excepting that he particularly insists upon congestion, as an important pathological state of some forms of the disease; — but in this he merely followed STAHL, JUNCKER, R. SPRENGEL, JACKSON, and some other older as well as contemporary Continental writers. Upon the whole, his views, both pathological and practical, are so contradictory and vacillating, that a reference cannot be made to them with any degree of confidence.

89. IX. PATHOLOGICAL STATES — i. The EARLY

CHANGES IN FEVER.* In approaching the pathology of fever, there are certain circumstances to be kept in view: — *a.* That the chief causes, particularly malaria and animal effluvia, exert a noxious or poisonous influence upon the economy: — *b.* That these agents, usually tainting the surrounding atmosphere, when acting injuriously on the frame, pass along with it into the lungs during respiration; — the extensive surface there exposed to the tainted air; the organic properties, relations, and functions of this surface; the constant renewal of the air brought in contact with it, &c., favouring the action of these agents in this quarter in preference to any other with which they can have any communication: — *c.* The uncertain period that elapses between the time at which the morbid impression is made, and that at which it developes the fully formed malady; this period being usually of several days' duration, often much longer, and occasionally very much shorter or almost instantaneous, especially when the cause is intense and the predisposition strong: — *d.* The general character of symptoms constituting the formative and invading stages (§ 33. 35.): — *e.* The state of function or vital manifestation throughout the frame, and the evident changes in the fluids and solids, in the various periods of the malady: — *f.* The complications and local determinations which supervene in the course of fever, and the periods at which they present themselves: — *g.* The external appearances and nature of the lesions observed after death, the seat of these lesions, their number and extent, and the relation they bear to the symptoms during life: — *h.* The obvious differences between the structural changes and those usually consequent upon common inflammation: — and, *i.* The frequent absence of any lesion sufficient to account either for the symptoms or for death.

90. *Existing opinions* as to the nature of fever, particularly as respects the changes immediately following the exciting causes, may be reduced to the following: — 1st. That fever arises from inflammation, seated, according to some, in the brain, and, to others, in the digestive mucous surface, but sometimes also reflected upon the brain: — 2d. That it depends upon congestion of the large vessels and internal viscera: — 3d. That it proceeds from the direct contamination of the circulating fluids by its material cause, — the nervous symptoms, local affections, inflammations, &c. appearing in its course, arising from the action of vitiated blood upon the organs: — 4th. That the causes first affect the cerebro-spinal nervous system, the phenomena of fever arising from the changes produced by them upon this system: — and, 5th. That the morbid impression is first made upon the organic or ganglial nervous system, and, owing to the circumstance of this system actuating the circulating, secreting, and excreting viscera, is manifested, in an especial manner, by the changes observed in the state of vascular action, in the animal temperature, in the functions of secretion and excretion, in the circulating fluids, and in the other functions which are more or less intimately dependent upon the ganglial system. (See my views respecting this system, in the *Appendix* to M. RICHERAND's *Elements of Physiology*, p. 556.: and as to its pathological relations, &c., particularly in connection with the causation of fever, in the *Lond. Med. Repos.* vol. xvii. p. 376.)

91. *A.* The doctrines imputing fever to *inflammation of the brain*, or of *the digestive mucous surface* are subverted by nearly the same facts and considerations: — *a.* Inflammatory appearances are not uniformly observed in fatal cases, and *a fortiori* cannot generally exist in those which recover. — *b.* The lesions which actually exist, although possessing certain of the characters usually ascribed to inflammation, are wanting in others, especially those indicating sthenic, or purely inflammatory action; therefore these lesions, as stated above (§ 50.), are either not the consequence of inflammation, or the result of an inflammation remarkably modified from the common or idiopathic kind, by some superadded cause, or by pre-existing changes in the state of vital power, and of the circulating fluids, as will appear hereafter. — *c.* As the lesions, whatever their nature may be, are often inadequate to account for the symptoms, or for death, they are to be looked upon as contingent phenomena, or merely as the grosser portion of those changes, supervening throughout the frame; the whole group of symptoms, their succession, and the ultimate issue, depending more upon the functional disorder in the first instance, and the consequent changes in the fluids and general organisation, than upon the more palpable lesions of structure, which occur in different parts from various influences determining or exciting a predominant state or grade of the morbid or general action, during its course, to some particular viscus or structure. — *d.* The inflammatory appearances observed after fevers are not co-ordinate with those produced by inflammation, nor are they identical with, or even similar to, them (§ 50.). — *e.* These lesions are not restricted to the same situation or viscus, the inflammatory complications or local determinations whence they proceed, being chiefly seated in different organs, in different cases and different epidemics; — the stomach and bowels being principally or predominantly affected in one case or in one epidemic; the head in another; the lungs in a third; the liver in a fourth; according to various predisposing, concurrent, and determining influences, as previous disorder, mental distress, the temperature, season and weather, the state of the air and of the locality, fatigue, exposure to cold, &c. — *f.* The existence of vascular congestion, although more

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* The views embodied in this chapter, and indeed throughout the whole of this article, which are not assigned to some other writer, especially those on the *Nature and Complications of Fever*, were promulgated by me on various occasions, and in different works, since 1819. In 1820, 1821, and 1822, they were published in the *Foreign Medical Review*, the *Medical and Physical Journal*, the *London Medical Repository*, and other works (see the *References*.). In the winter of 1820 and 1821 they were fully stated, in answer to the views of Dr. CLUTTERBUCK, during a discussion at the London Medical Society, in which that able physician and myself were chiefly engaged, for three successive evenings. They were also fully developed in my lectures from 1824 to 1827, and in the Westminster Medical Society, as reported in the medical journals of the day. My experience of fever had been considerable previously even to the earliest of these dates. I had treated the most malignant types and complications of fever in the most pestilential climates within the tropics; I had closely observed the typhoid forms of it which prevailed in Germany and France soon after the late war; and had seen and treated it as it presented itself in various parts of Great Britain since the year 1810. I state this, in order to show that whatever opinions are here offered, similar to those contained in works which have appeared subsequently to 1821 and 1822, are certainly at least not derived from them.

common than the other inflammatory appearances, in no way supports this doctrine of fever, inasmuch as it may be present to the extent observed in most instances of fever, without causing much disturbance, or it may supervene shortly before death, or even immediately after dissolution. But readily granting its existence even early in the disease, it is merely one of several changes consequent upon others much more important, as will appear in the sequel (§ 92.).—*g*. Those who believe in the inflammatory origin of fever do not agree respecting the particular viscus which is its especial seat; some assigning one organ, others another: the diversified complications, or predominance of morbid action in one viscus, or even in several, over others, in different cases and epidemics (*e*), furnishing them with the only arguments they can assign in favour of their opinions. — *h*. The changes supervening in the blood, in the secretions, and in the general organisation, during the progress of fever, cannot be explained by, or reconciled with, its origin in local inflammation. — *i*. The appearances considered inflammatory, and to which this class of pathologists refer in support of their doctrine, most frequently take place in the progress of fever, and seldom at its commencement, as shown by a careful observation of the symptoms. — *k*. The tendency to a favourable termination, and to natural crises, is much more remarkable in *fevers*, than in *inflammations*. — *l*. The general characters of fevers vary remarkably in different epidemics and epidemic constitutions, — a circumstance not remarked in respect of inflammations, or in a much slighter degree, — and lastly, the *juvantia* and *lædentia*, in both respectively, indicate a great difference between them. The extent to which depletions can be carried in both, and the frequent benefit derived from very opposite measures in the former, and which are injurious in the latter, are also no mean proof; for although vascular depletions are often requisite to control the local determinations or even inflammations which supervene in the course of, or early in, fevers, yet they cannot, owing to the state of vital power, be carried so far as in pure inflammations; and, although evacuations are most necessary in some epidemics, and tonics or stimulants injurious, still the former cannot be practised to the same extent, at least in this climate, as in the phlegmasiæ; whilst in epidemics of an opposite character, bleeding is often injurious, and opposite means are required, — a circumstance not observed respecting inflammation.

92. *B*. Certain of the arguments now urged are equally applicable to *the doctrine of congestion*, or *irregular distribution of the blood*. — *a*. The espousers of this opinion do not agree among themselves as to the chief seat of congestion; but granting that it very frequently, or even generally, exists at some period of the disease, especially in the large vessels adjoining the heart, it is only one link of the chain of morbid causation and action, itself being caused and attended by, as well as inducing, other changes equally important. Besides, those instances which occasionally occur of remarkably great congestion of the large vessels of internal viscera, as from asphyxy, &c., are not followed by the phenomena of idiopathic fever; and although, as I shall have to show hereafter, many of the worst forms of fever are attended by congestion as one only of the various changes that characterise them, yet others of a slight kind, as ague, are accompanied with still more remarkable congestion during the cold stage of each paroxysm, without further mischief than the subsequent reaction which it aids in developing. — *b*. When congestion becomes considerable, it is referrible to the noxious influence of the exciting causes exerted primarily upon the organic or ganglial nervous system, and consecutively upon the vascular system; the action of the heart being thereby weakened, and the tone and resiliency of the vessels impaired; and hence, when the morbid impression on the former is very intense, the effects produced upon the latter are also severe, congestion being only one of these effects. — When, in consequence of the persistence of the morbid impression, or change primarily produced in the ganglial nervous system, the effects upon the heart and vessels continue, the resulting congestions, with the other concomitant lesions, either cannot be removed, or are removed with difficulty; the heart being rendered unable to exert a due reaction in order to overcome them; the vessels being incapable of that degree of tonic resistance necessary to a healthy circulation and a regular distribution of blood; and the capillaries being impaired in all their functions, owing to the state of nervous power influencing them, and of the circulation in them. Thus congestion is established as one of the more evident lesions that follow the primary changes in fever, — but only as one of subordinate importance.

93. *C*. To the doctrine that imputes fever to *the direct contamination of the circulating fluid by the material cause*, the following objections may be urged: — *a*. The febrile cause, acting as a poison, should instantly affect the appearance of the blood if it made its first and principal attack in this way; but, when the cause is energetic, the effects, instead of progressively and gradually appearing, as they necessarily would do in this case, instantly manifest themselves in the functions of the nervous systems, more especially of the organic nervous system, and in the functions of the organs actuated by it. I shall, however, have hereafter to show, that the blood is the next animal constituent that becomes affected, although frequently in no very manifest manner, at first, especially when disease slowly developes itself upon the exciting causes. — It should not be overlooked, in our researches on this subject, that agents which especially affect or depress the organic nervous influence, produce also co-ordinate effects upon the vascular system and on the blood itself, owing to the intimate connection subsisting between these two systems. — *b*. In cases where the morbid impression has been already made, either by malaria, or by infectious effluvia, the full developement of the disease may be prevented during the first or second stage, by substances which produce a powerful restorative or tonic action on the nervous systems, particularly that of organic life, — an effect that could not result if the blood were the primary or principal seat of the disease. A powerful stimulant or tonic will instantly cut short an ague, even when given at the commencement of the cold stage, — an effect that would vainly be looked for, if its chief seat were in the blood. — *c*. The phenomena and progress of

those diseases, as scurvy and purpura hæmorrhagica, in which the blood is especially altered, furnish analogous indications that it is not the primary nor sole seat of fever, but that it is merely secondarily affected, to an extent varying remarkably in different fevers and epidemics; and that the change in this constituent is only a part of the general state of disease — is only one of the many lesions forming idiopathic fever. — *d.* The abatement of fever after crises has been considered as evidence of the primary affection of the blood. Granting that morbid matters carried into the circulation, or generated in it from a morbid seminium, are eliminated from it in the form of crises, or by less manifest evacuations, still this is no proof that the blood is primarily or chiefly changed; but merely that it is one of the animal constituents affected, more particularly in certain forms of fever, as the eruptive and infectious; for we often observe critical discharges occurring without any permanent benefit, as in remittents; and recovery taking place in others without any crises. Whilst, therefore, a numerous class of fevers, especially the periodic and simple continued, present little or no evidence of contamination of the blood in their course, unless they change their characters and become complicated, a different class, as the adynamic and malignant, presents as little evidence of this change at their commencement; the vitiation of the circulating current appearing either consecutively upon the morbid impression made upon the nervous system of organic life, or nearly contemporaneously with this impression, and in a less manifest degree, although progressively advancing, owing to the affection of this particular system, and its influence upon the circulation. But the arguments which are about to be offered in support of my views as to the primary lesions in fever, will more clearly show in how far the blood is concerned in causing many of the phenomena of fever in its more severe forms.

94. *D.* The doctrine that *the causes of fever first affect the cerebro-spinal nervous system* is invalidated by the following considerations: — *a.* This system either does not send nerves, or it supplies but few nerves, and those often indirectly, to the organs especially or essentially affected in idiopathic fevers, as the heart, blood-vessels, secreting viscera, lungs, &c. — *b.* That the chief avenues to this system open to the invasion of the exciting causes, are the organs of sense and the cutaneous surface. Of these, the sense of smell is the principal. Although this sense is evidently impressed by several of these causes, when acting intensely, and admitting that the brain is somewhat affected in consequence, still the effect produced in this quarter seems inadequate to explain the chief, and far less the whole, of the early phenomena. — *c.* In some instances, the intense operation of the effluvia generating fever, has produced its effects almost instantly, and even caused death itself with equal rapidity, — a result, which the total annihilation of the cerebral functions could not produce; but which would necessarily follow the interruption or suppression of the influence transmitted to the heart and lungs by the nervous system of organic life. — *d.* The generation of fever within the body itself cannot be explained upon the supposition that the cerebro-spinal nervous system is primarily and solely, or even chiefly, concerned in the production of the disease; but may be readily solved by means of the nervous system of organic life, if we take into consideration its functions and structural relations, especially with the vascular system, the circulating fluids, and the excreting viscera. (See DISEASE, § 65.) — *d.* The early lesions, whether of function or of organisation, characterising the first as well as the advanced periods of fever, cannot be accounted for by assigning the cerebro-spinal nervous system as the primary seat of the disease; for, — 1st. As this system cannot influence the action of the heart and the state of the vessels, excepting through the medium of the organic nervous system, and thus only to a very limited extent, changes in it do not explain the alterations of vascular action, and still less the vitiation of the blood; — 2dly. As it does not control animal heat, so it cannot induce those remarkable extremes and morbid states of temperature distinguishing the malady; — 3dly. As it does not supply, nor materially influence, secreting surfaces and glands, so it cannot give rise to those early changes of function which they present, nor to those lesions of structure which they often subsequently experience; — 4thly. As it does not materially affect the actions of assimilation and nutrition, so it cannot occasion the remarkable changes they present in fevers; — and, 5thly. As it does not present aberrations of function, in the slighter and simpler states of fever, equal in degree to those manifested by the viscera chiefly supplied by the nerves of organic life; and as, when such aberrations supervene in a remarkable manner, they are generally consequent upon those of the organic nervous and vascular systems and of the blood itself, so the primary impression made upon it must be much less energetic than is supposed by those who support the present doctrine; although I may grant that it partakes, in some measure, or in some forms of fever, of the morbid impression especially and principally made upon the nervous system of organic life, and extended to the organs which it actuates.

95. *E. That the efficient agents of fever act primarily and chiefly upon the organic or ganglionic nervous system,* is evident from what has been now adduced; and is further proved by the following facts and inferences: — *a.* The intimate connection of this system with the organs of circulation, respiration, assimilation, and secretion, on the one hand, and with the cerebro-spinal nervous system on the other, and the influence exerted by it over their functions in health, are sufficient to show, that morbid impressions made upon it must necessarily affect all the organs and parts, with which it is related. — *b.* The functions primarily disordered in fever, and chiefly affected in its course, are precisely those which are especially subjected to the influence of this system. As we cannot, consistently with our knowledge of the animal actions in health and in disease, infer that a grave and permanent disorder of any one function can exist, unless either the influence that actuates it is impaired, excited, or otherwise altered; or the structure of the organ, which is the instrument of the function, is more or less affected; we are necessarily led to inquire as to which of these sources the disorder is to be imputed. Having inferred from the nature and extent of the disorder, from

the causes in which it arose, and the suddenness and manner of its occurrence, as well as from various other circumstances, that it does not consist of lesion of structure, we are therefore compelled to adopt the former alternative, and, from the kind of disorder, to infer the manner in which the influence actuating the organ is affected. Thus, observing that respiration, circulation, secretion, and animal heat are primarily and especially disordered at the commencement of fever, and that various other morbid phenomena are consequently produced, and finding no structural or local change to account for the affection, we refer it to the state of the influence which actuates these functions. Anatomical and physiological evidence concur in showing that the nervous system of organic life is chiefly concerned in the production of those functions; and therefore it may be inferred that this system is first impressed by the causes of the disease.

96. But it is not merely requisite to shew the particular system first affected, but also to ascertain, as nearly as possible, the *nature* of the affection. This, however, can be only a matter of inference from the kind of disorder manifested in the functions especially subjected to the influence of this system. What, therefore, is the general character of the disorder which these functions first evince? — 1st, The respiratory actions are inadequately performed, volition being often exerted in order fully to dilate the lungs, and the changes in the blood are imperfectly produced;—2dly, The action of the heart is weakened, and the tone of the pulmonary vessels lowered, so that the circulation is languid, irregular, &c., and congestion supervenes; — 3dly, Secretion and excretion are impeded or interrupted, animal temperature diminished, and all the functions indicate at first depression or suppression of the organic nervous influence. There is, however, reason to suppose that this influence may not only be *depressed*, but that it may be otherwise *altered*, according to the cause which affects it, particularly by specific infectious miasms. It is chiefly to this circumstance, that the opinions of JACKSON, FRANK, HILDENBRAND, and others, respecting the irritation excited by the material cause of fever, is to be imputed. Whether the alteration in question be called an irritation, or any thing else, is immaterial, if the term adopted convey any idea of what the change is, in most of the circumstances in which it occurs. But if by this irritation be meant a form of excitement, the term is applicable only to the state of vascular action often consequent upon, and attended by, the alteration of nervous influence, and not to the state of the influence itself. The whole that we know of the matter, from observation of the earliest phenomena, is, that the change evinces diminished power or influence of the system of nerves actuating the organic functions, and very frequently an otherwise altered or morbid state of this influence which cannot well be described, but which is variously modified in different fevers, and is generally attended by depression; these conditions still continuing in diverse grades, although vascular reaction supervenes, which, when it becomes excessive, increases them, and, in consequence, hastens on disorganisation. From this it will appear, that the exciting causes of fever first depress or otherwise alter, or both depress and alter, the healthy influence exerted by the nervous system of organic life. That they primarily irritate or excite this system does not appear from the phenomena, unless either of these states associates itself with some other morbid condition which deflects it from its usual forms; but of this we have little proof, unless it be found in the stage of reaction. This much, however, is apparent, — that certain causes seem to depress the organic nervous influence more than others; and that some alter it more from the merely dynamic states, and impress it with a specifically morbid character.

97. But, whilst disorder of this influence is thus considered the chief and primary constituent of the morbid impression made by the causes of fever upon the economy, it may be asked, Is the impression entirely limited to this quarter? or are the cerebro-spinal influence, and the circulating fluid itself, also partially and primarily affected? — 1st, As to the former of these, it may be inferred, from a consideration of the circumstance of the nerves of one of our senses being extended over the upper part of the respiratory passage — the entrance to a most important and vital organ — in order to convey, by their reports, intimations of the presence of such gases or vapours, as, if received into the lungs, would prove injurious, that the more intense causes will act in some measure upon the brain, although in a comparatively slight and evanescent manner. The lungs evidently digest the air received into them, as much as the stomach digests the food; and the entrances into both organs are guarded by two sentinels — the senses of smell and taste — taking cognizance of whatever passes into them. But in cases where injurious effects follow the ingestion of hurtful matters, is it in the stomach or in the nerves of taste that the morbid impression is to be looked for? and if it be in the former, and not in the latter, that they are to be found, no more should we infer, as heretofore, that the morbid change is first produced on the brain, and not on the nerves of the lungs, when noxious effects follow the respiration of a tainted or infectious air — recollecting always, that respiration does not mean simply the passage of air into and out of the lungs, but the actual digestion of this air by them, the important changes excited by its constituents upon the blood and upon the organic nervous influence, and those effected by this influence upon the blood, and upon the air received into the organ.

98. From various considerations and researches into the subject, in different climates, I infer, that, although the more intense causes may affect the brain, and thereby heighten and accelerate the effects upon the heart and stomach arising from the impression made upon the organic nervous system, yet their action in this quarter is evanescent; and, as I have shown (§ 94.), insufficient to explain the phenomena. Judging from my own sensations on having inspired an air so loaded with infectious effluvia as to be remarkably offensive to the smell, the morbid impression was first sensibly felt in the lungs themselves; numbness, weight, or oppression in the chest, was instantly felt; frequent forcible inspirations were made, and continued for long afterwards to be made, in order fully to dilate the lungs, which felt as if they were partially deprived of their resiliency; the pulse became weak, and the animal tem-

perature was lowered; but the functions of the brain were not impaired. In this case, the lungs were certainly the first organ affected, and almost instantly afterwards the action of the heart and the functions of the stomach. Instances, moreover, are not infrequent, in which the febrile cause has made its impression, and the patient has been removed from every chance of having that impression renewed; and it has not, until the end of weeks, and even months, given rise to its specific effects. In this case, is the cerebro-spinal system, or the nerves of organic life, or the blood, affected, and the seat of the latent, or almost latent impression? I have observed the phenomena occurring during this period, in cases of rabies, of small-pox, of measles, of scarlatina, of typhus, and of marsh or periodic fevers; and in every instance they have not indicated any affection of the cerebro-spinal system, but disorder more especially of the functions depending upon the nervous system of organic life. This period, moreover, is frequently shortened or prolonged; the symptoms attending it, diminished or aggravated; and the impending malady even prevented, by means which act more especially upon the latter system. Hence the importance of this inquiry; for by arriving at just conclusions as to the constituent part of the economy first affected, and the mode in which it is affected, we are the more enabled to guard against fever, or even to remove the morbid impression after it has been made, and before it has developed itself into open disease.

99. The opinion that the morbific causes even partially operate by first inducing changes in the blood, cannot be reconciled with the arguments already stated, and with others which may be offered, although there are circumstances which seem to favour it, the most forcible of which is the propagation of certain diseases by means of a virus, and the long period a virus or morbific miasm often takes to incubate or produce its full effects. But if we look closely into these very circumstances, we shall find that they are not so conclusive of the opinion they are adduced to support as is supposed; for in the case of an inoculated virus — the most favourable to the doctrine of primary contamination of the blood, — the consequent infection will be hastened by whatever depresses, and retarded by whatever exalts without exhausting, organic nervous power; it will be accelerated by the usual concurring and determining causes, as a close, foul, moist air, by cold, by excesses of any kind, and by despondency; and it will be retarded or even prevented by a dry and pure air, by the use of tonics, or what communicates power and increases vital resistance to the invasion of a noxious cause. The phenomena, also, observed between the application of the cause — whether a contagious virus, an infectious miasm, or an emanation from the soil — and the explosion of the malady, however prolonged the intervening period may be, cannot be referred to any alteration of the circulating fluids, that may not be shown to be entirely dependent simply upon the existing state of organic nervous or vital power. In rabies, in which the longest formative or incubating stage is observed, symptoms referrible to the organic nervous system are the first to appear, and the functions depending upon this system are those which especially languish during this period. The same is observed in agues, and in the specific infectious maladies. But even granting that a portion of the animal miasms passes into the blood, and vitiates it, the morbid impression is not the less made by them on the nerves of the organ, and not the less unproductive of the principal part of the phenomena more immediately supervening. But this topic is more fully illustrated in the article INFECTION.

100. In order to show what appears to be the common procession of phenomena consequent upon the impression of the exciting causes, I shall presume that a person in health, with no particular organ especially predisposed to disease, is exposed either to infection by the effluvium from a patient in typhus, or to the operation of marsh exhalations. In these cases the exciting causes, floating in the air, are received into the lungs, and, if they be concentrated or energetic, they slightly, although they may sensibly, affect the organ of smell in their passage. But their chief action is exerted upon the nerves of the lungs themselves. It may even be admitted that they also partially affect the blood during the digestion of the air which is their vehicle by the lungs: of this, however, we have no satisfactory proof; and as their direct operation on the nervous influence of this organ is sufficient to produce all the phenomena, it is unnecessary to assign an additional agency to explain them. The morbid impression having been thus principally made in this quarter, it is necessarily extended to those organs which are chiefly supplied with the same system of nerves; and thus the lungs, the heart, and blood-vessels, the digestive organs, and the secreting and assimilating functions, almost immediately experience the effects. As respects the lungs, their vital resiliency is somewhat impaired; hence, the frequent and forced inspirations; and the changes effected by the air upon the blood, which, although chemical, are partly also vital or influenced by the organic nervous power of the organ, are more or less impeded. This latter fact I endeavoured to put to the test of experiment. In a paper written at the commencement of 1815, I had endeavoured to prove that many of the phenomena of fever were referrible to diminution of the changes produced in the blood by respiration; and in 1817, when engaged in ascertaining the alterations effected in the respired air, under various circumstances, I found, in two cases of ague and in one case of remittent, just before the cold stage of the former, and near the first accession of the latter, that the changes in the respired air were diminished from one fourth to one third their usual amount. These experiments were too few, and not sufficiently varied, but they serve to illustrate the subject.

101. The effect, then, of the morbid impression on the organic nervous influence of the lungs being to diminish the changes caused by respiration on the blood, and to render the pulmonary circulation more languid, one source of the alterations observed in this fluid in the early stages of fever is made manifest. These alterations, at this period, seldom extend beyond a darker or more venous appearance of the blood than usual, the crassamentum being often soft and imperfectly separated from the serum. Almost contemporaneously with the effect upon the lungs, the -

action of the heart and the tone of the vascular system generally, become diminished. Hence the increasing languor of the circulation, the internal congestions, and the deficient secretion and excretion; these last, however, depending as much upon the state of organic nervous influence as upon the circulation in the secreting organs. The congestions of the large vessels, and the changes in the quantity and quality of the blood, consequent upon deficient secretion and excretion of its watery and noxious constituents, having reached a certain pitch, bring about vascular reaction, if the organic nervous or vital influence be not too far reduced, or otherwise altered, by the exciting causes; but when the morbid impression has been very intense, and the more immediate changes very great, reaction either takes place imperfectly, or does not supervene at all in extreme cases, vital power being insufficient to develop increased vascular action. Such appears to be so far the progress of the phenomena, as respects the organic functions. The cerebro-spinal manifestations are also early affected — in a slight and passing manner by the impression made by the noxious effluvia on the nerves of smell; but much more seriously by the influence exerted by the organic nervous system upon the brain and spinal cord, or extended from the former to the latter, and consecutively by the changes in the states of vascular action and of the blood.

102. *F. Consecutive Pathological States.*—When reaction thus supervenes upon either of the specific causes mentioned above (§ 100.), it may be variously modified according to the association of various grades of increased vascular action and of diminished or otherwise altered nervous or vital power, and to the local determinations or complications attending it. When, in consequence of the nature and intensity of the causes, relatively to organic nervous energy, the former do not depress the latter beyond the power of reaction, whereby the morbid impression is effaced, and the effects upon the different organs and on the blood are removed, the more sthenic forms of fever take place, vascular action is high, and nervous or vital power not greatly impaired. But when the nature and intensity of the causes are such, in relation to vital power, as greatly to depress or otherwise change it, the more adynamic forms are produced, and vascular reaction is much less energetic, the depressed state of vital power being a prominent and increasing feature throughout the disease. In some of the latter forms, vascular action becomes either excessive or tumultuous relatively to the state of nervous or vital power, owing to the effects produced by the secondary changes in the blood, upon the heart and blood-vessels, and on the organic nervous system, and rapidly exhausts itself, or passes into disorganisation; and in others reaction does not supervene, the tone of the vessels being progressively diminished, and the blood with the soft solids more and more changed. Hence result, in the last stages, discolouration, softness, flaccidity, lessened vital cohesion, and infiltration of membranous and parenchymatous tissues, with effusions of fluids from mucous and serous surfaces.

103. *G. Local determinations and complications* may attend fever from an early period, or appear at any time during its course, or even at its decline; owing to the circumstances influencing its terminations (§ 47.), but especially to the following: — 1st. To pre-existing functional or structural lesion of an organ or tissue; — 2d. To the predisposing and concurring causes; — 3d. To the nature and intensity of exciting and specific causes; — 4th. To the character of the epidemic; — 5th. To various determining or consecutive influences; — 6th. To the effects of reaction upon certain viscera; — 7th. To interrupted excretion; — 8th. To the morbid states of the circulating fluids exciting disease, quickly passing into disorganisation; — and, 9th. To injudicious treatment.

104. *a. Pre-existing disease of a part*, especially when seated in the alimentary canal, brain, or lungs, aggravates fever and gives it a modified form. A loaded or congested state of the liver, also, in respect either of its vascular system or of its biliary ducts, often disposes to fevers, and imparts to them a bilious or gastric character. Various lesions observed after fever, and sometimes imputed to it, have existed previously, or have been merely aggravated by it, particularly those seen in the pleura and in the liver, and some of those found within the cranium.

105. *b.* The *predisposition* arising from the use of unwholesome water and food especially favour the low types of the disease, with lesions of the mucous follicles and membrane, which can hardly be said to be inflammatory, and contamination of the blood; that from excessive mental exertion or anxiety, increased affection of the brain; and that from gross living and intemperance, complications with disease of the liver, stomach, and bowels. The *concurring*, *determining*, and *consecutive agencies* not merely develop the action of specific causes, as shown in the article DISEASE (§ 61.), but they also complicate the fever produced. Thus cold both aids the operation of other causes, and occasions increased pulmonary disorder; and the influences of season, weather, climate, confined air, &c. cause aggravated affections of the intestines, or of the liver, of the brain, of the respiratory passages, or of the circulating fluids.

106. *c. The nature and intensity of the chief or specific causes* often determine the complication.— Malaria most frequently causes congestion of the liver and spleen; the emanations from persons affected by low fevers, aggravated affections of the digestive canal, of the brain, and often also of the lungs; and the exanthematous effluvia, their specific eruptions, and disease of digestive mucous surface and pulmonary organs; these local aggravations of the malady appearing chiefly where the causes have acted most intensely relatively to the state of vital power and predisposition, or have been added by concurring influences. The complications in fevers produced by the former of these causes are the least severe, and those arising from infection the most dangerous, owing to the states of vascular action, of vital power, and of the circulating fluids generally accompanying them; the first of these states being often excessive, or of an unfavourable kind; the second depressed or otherwise altered; and the third more or less changed from its natural condition, or even contaminated.

107. *d.* The complications are different in re-

spect of their seat, nature, and severity, and the states of local action, of vital power, and of the circulating and secreted fluids, in *different epidemics*, often independently of season, climate, weather, and locality, although these have much influence in many that are limited in their diffusion. Consequently, the complications are much more prone to pass into disorganisation in one epidemic than in another; but those occurring in the epidemics of warm countries are more uniform in their character and seat than those observed in the epidemics of temperate countries. It is chiefly upon a close observation of all the circumstances connected with their complications, that a successful treatment of epidemic fevers depends.

108. *e. Reaction* or *vascular excitement* occasions local determinations and complications, which generally present more or less of an inflammatory character; the brain, alimentary canal, the liver, or lungs, most frequently being the seat of the predominant affection, and evincing the effects of it after death. If, however, vascular action far exceed vital power, the superinduced local affection seldom presents many of the truly inflammatory characters, as shown above (§ 50.), and it often rapidly passes into disorganisation, or gives rise to sanguineous, serous or sanious effusions, but very rarely to the effusion of lymph or of albuminous fluids, unless in the most sthenic state of the disease.

109. *f. Interrupted excretion* induces complications frequently at far advanced periods of fever, especially implicating the bowels, the liver, and brain. They are generally of a most severe, although often insidious form, owing to their association with depressed or exhausted states of the constitutional powers; these states having been more or less concerned in causing the imperfect excretions, and with alterations in the blood, which the latter has contributed to produce; and they often quickly pass into structural lesions, not so much from the inflammatory or increased vascular action which attends them, as from the septic and contaminating effects of the retained excrementitial matters upon the tissues, and from their depressing influence on the nerves of the part.

110. *g. Morbid states of the blood* induce the most dangerous complications, and, like the preceding, most frequently at advanced periods of the disease, the mucous membranes, PEYER's and BRUNNER's glands, the brain, and the lungs, being the parts chiefly affected. As the changes in the blood are chiefly caused and attended by a depressed or altered state of organic nervous power, the local affections caused by them, whether they be characterised by increased vascular action or by simple congestion, generally pass quickly into structural lesions, especially of the mucous membranes, or give rise to effusions of a sanguineous, foul, dark, or sanious fluid, either from these membranes or from serous surfaces.

111. *h. Injudicious regimen and treatment* are much more frequent causes of aggravated local lesions in fever than is supposed. External heat or cold inappropriately employed; the improper use of stimulants and tonics; the neglect of suitable evacuations early in the disease; and the use of acrid or irritating purgatives; frequently occasion or heighten predominant affections of the intestinal mucous surface, of the liver, and of the brain. Excessive doses, or the prolonged and inappropriate exhibition, of antimonials, especially tartar emetic, in the manner often resorted to in Italy, have evidently caused serious irritation and ulceration of the mucous membrane of the stomach and bowels, without producing either sickness or vomiting after its first operation in this way. The too early and free use of bark, or of quinine, in periodic fevers, or before morbid secretions have been evacuated, and congestions of the liver removed, has often induced serious inflammation and structural change in the liver.

112. *i.* It must be evident from the foregoing that the predominant affections or complications of fever must vary, not merely in their seat, but also in their intimate nature, in its different types and forms; the low and adynamic states being attended by those which are the least inflammatory, the most imperfectly indicated by the symptoms, and the most prone to pass quickly into disorganisation; this event, indeed, often being the first indication of their existence. It requires, therefore, a close scrutiny of the various functions to detect them, especially when they are seated in the *intestinal canal* and *lungs*. Although the complications in *the former* of these situations may be indicated by tenderness on deep pressure, by distension or fulness of the abdomen, and by the appearance of the evacuations, yet they may be present, nevertheless, without any such signs, even the stools evincing no very material disorder. When the stools are copious without any amendment, and particularly if they continue so, the pulse being weak, soft, and very frequent, and the skin harsh, lurid, or discoloured, we should dread the presence of disease of the digestive mucous surface and follicular glands; and if these symptoms be attended by flatulent distension of the abdomen, and by blood in the evacuations, this complication most probably exists. The complication with disease of the *substance of the liver* is often equally obscure in the adynamic varieties, more especially when the brain is much affected; for, although fulness and tenderness in the region of the organ, or a rising of this viscus high into the right thorax, as detected upon percussion, may sometimes be present, yet serious lesions may supervene without any of these indications being observed.

113. *k.* Most serious *disease and even disorganisation may affect the lungs*, particularly in the low forms of fever, without cough or pain being complained of. This organ, therefore, should receive due attention, and its state be inquired into by percussion and auscultation, which will very often detect bronchial affection, and hepatisation or infiltration of it, although these lesions may be either imperfectly or not at all indicated by the usual symptoms. When the pulse is very soft and weak; the lips, tongue, and skin are dark, lurid, or livid; the delirium is low or muttering; and the respiration is hurried and laboured; the changes effected on the blood in the lungs are evidently impeded, and the cause exists either in depressed nervous influence, or in more palpable disease of the respiratory apparatus, or even in both; for the latter is often the indirect consequence of the former. In the low forms of fever, the changes that supervene

in the bronchial surface, or in the substance of the lungs, as well as those that take place in the alimentary canal, possess but little of the truly inflammatory character, excepting capillary injection sometimes with infiltration of a sanguineous serum into the adjoining tissues, or with effusion of a similar fluid from the injected surfaces.

114. *l. Predominant cerebral affection* less frequently amounts to actual disease, or passes into disorganisation, in fevers, than has been very generally supposed; the disorder most commonly existing in this quarter, in low fevers especially, being more functional than structural—depending more upon the state of organic nervous influence in the organ, than upon inflammatory or other lesions. The effusions and congestions observed in fatal cases, are probably in great measure *post mortem* changes; and, even granting their existence during life, they are often insufficient to account for the symptoms referrible to this part. Whatever the alterations existing within the cranium may be, there can be no doubt that, when the affection of the brain is very predominant, lesions in other situations are very seldom complained of, and with difficulty detected. The above complications, as well as others casually alluded to, will be more fully elucidated, when the particular species of fever come under consideration.

115. *m.* It is evident, from what has been stated respecting the pathology of fever, that a most scrupulous and minute inquiry into the states of organic nervous or vital power, evinced in all the functions, and of vascular action and tone—into the evidence of local congestions, or predominant visceral affection — into the existing functions and lesions of individual organs — and into the conditions and appearances of the secreted and excreted fluids, of the blood, and of the solids — should furnish the basis of our curative intentions, and direct the choice of individual means. Nor ought it to be overlooked, that the mutability of fever is so remarkable, that the pathological states actually existing at the time of investigation, may change their characters and even their nature, in an hour or two afterwards; that each successive stage is very different in the grouping of the phenomena, and in the conditions of vascular action and vital power, from that which preceded it; that serious complications or predominant affections may suddenly arise and become almost irremediable in a very short time; and, consequently, that the treatment devised should be promptly administered; and prescribed either with reference to the usual successions of morbid states, or merely for a period, in which no very important change is likely to take place.

116. X. General Treatment.—The treatment of fevers is *prophylactic* and *curative*. The former has been little attended to by writers, and but imperfectly understood; and the latter has too frequently been directed, without due attention to pathological states, and often with an imperfect knowledge of their seat and nature. Before a general view of the curative treatment of fevers is exhibited, a few remarks on their prevention will be necessary.

117. i. Prophylactic Means. — The prevention of fever should have reference — 1st, to the avoidance of its causes, and the seclusion of those suffering infectious forms of it; — 2dly, to means which may destroy or dilute its more specific agents, and counteract their operation; — 3dly, to measures calculated to fortify the frame against the impression made by them; — 4thly, to means which may prevent the development of disease after the impression has been made;—and, 5thly, to a treatment calculated to arrest its further progress at a period when arrest is still within the reach of art. The *first, second,* and *third* of these are so fully insisted upon in the articles Endemic Influence (§ 20.) and Infection, that little further need here be advanced respecting them; the remarks offered under these heads having especial reference to *periodic* and *infectious fevers* respectively.

118. *A. Measures calculated to fortify the frame against the impression of the exciting causes of fever* often succeed in preventing it, especially when these causes are of casual occurrence and of short continuance, or when their presence is known or suspected, and their nature tolerably understood. But in epidemics, particularly those which are pestilential, where these conditions do not obtain, means of this description generally fail, their causes being more generally diffused, and in almost continual operation. The measures resorted to, in order to resist the causes of fevers, should have reference to the habits and circumstances of the individual, to his constitutional powers, and his habit of body. All the predisposing causes should be carefully avoided. Vascular plethora ought therefore to be reduced, and vital power and resistance promoted where it is lowered. High irritability, vascular fulness, and rigidity of fibre, seem to predispose to several pestilential epidemics, especially to yellow fever; and, although these states will often resist for a long time the operation of marsh exhalations, particularly in temperate countries, yet such is not generally the case as respects persons migrating from cold to hot climates; for they commonly experience, in consequence of these states, much more violent attacks of fever than those who have been seasoned to the country; the fever in them often evincing inordinate excitement and re-action, and consequently assuming characters which have caused it to be confounded with the true or epidemic yellow fever. The most efficient resistance to the action of the causes of fever, is afforded by a due performance of all the organic and mental functions. Hence, whatever over-excites or depresses them will be injurious. Confidence, continued mental occupation, and moderate excitement, are especially efficacious in resisting the causes of most fevers. There is a moral courage sometimes possessed by persons, the weakest perhaps in respect of physical power, that enables them to resist infectious and epidemic influences, more successfully than the most robust, who are not thus mentally endowed.

119. The quarter in which the most active causes of fever invade the system should not be overlooked, for the casual or temporary operation of infectious effluvia, when their presence is anticipated, may be easily and certainly guarded against by the use of the aromatic spirit of vinegar, or by keeping a small piece of camphor in the mouth. When terrestrial emanations are present, care should be taken not to be exposed to the morning or night air, especially with an empty stomach, as they are then most concentrated; nor

to sleep in apartments upon or near to the ground floor, for the body is most susceptible of their influence on these occasions. When such precautions cannot be used, a cup of coffee should be taken before going abroad, and a pill with two or three grains of quinine and one or two of camphor at bedtime; but these means are of most benefit in cases of short residence in unhealthy localities, for which occasions I have directed the following pills with success.

No. 220. ℞ Camphoræ rasæ ℈j.; Quininæ Sulphatis ʒss.; Pilul. Galban. Comp. ʒj.; Pulv. Capsici gr. xvj.; Balsam. Canadensis, q. s. M. Fiant Pilulæ xxxvi., quarum capiat duas vel tres hora somni.

120. The system should not be stimulated by wines or spirits, unless better means are not within reach, and even then these should be used in very moderate quantity, otherwise exhaustion and its attendant predisposition will result from them. The same objection is applicable to cigar smoking; care ought also to be taken not to inhale the breath, or the effluvium proceeding from under the bed-clothes, or from the evacuations of persons in continued fevers, whatever means of resistance may be employed; but more especially with an empty stomach, or in states of debility or exhaustion, should this precaution be observed. During the prevalence of epidemics, of which infection is one of the chief elements, or causes of diffusion, strict seclusion can alone be depended upon. Still, other means should not be neglected. It has been supposed, that external irritation, or the discharge from an issue or seton, will prevent an attack of epidemic or pestilential fever; and cases have occurred to countenance the opinion, but they are not sufficiently conclusive. Upon the whole, a due regulation of the digestive, the secreting, and the excreting functions; avoidance of all causes of physical and moral depression; and a proper recourse to the additional means recommended to *prevent* Infection, in that article, are most to be depended upon.

121. B. *After the morbid impression has been made, the development of fever* may often be prevented, if the patient no longer remain subjected to the operation of the exciting causes. We have seen that disease is frequently many days in forming, the system manifesting slight disorder only during the time (§ 34.). The object on such occasions should be to enable the frame to maintain a successful struggle against the impression that has been made, and its more immediate effects. With this view, all the causes enumerated in the article Disease, under the name of *determining or consecutive* (§ 61.), should be carefully avoided, especially exposure to cold, to wet, and moisture; the use of cold fluids, and of cold, indigestible substances; excesses of every kind, and the common causes of physical and mental depression; and the patient ought to remove to a pure, dry, and open air. *Tonics* ought at the same time to be employed, especially such as determine the circulation to the external surface, improve the tone of the digestive organs, and promote the secretions and excretions, particularly those of the bowels and liver. When the actions of the bowels require aid, cold and debilitating aperients should not be prescribed. Warm and *stomachic purgatives* or laxatives, or these combined with tonics, are the most appropriate. When the impression has been energetic, and made by infectious effluvia, an immediate recourse to *stimuli*, especially *camphor*, *ammonia*, aromatic spirits, spirits of nitric æther in tea, &c.; or, if these be not at hand, to warm wine whey, or brandy and water, will generally prevent any ill effects. The *diet* should be regular, moderate, nutritious, and easy of digestion; the stomach having nothing to do that it cannot perfectly accomplish. If these be found insufficient, a *warm bath*, followed by active *friction* of the surface; and, if reaction have not supervened, *warm diaphoretics* may be directed. If the patient still continue to complain of the symptoms of the formative stage, an *emetic*, with aromatic adjuncts (see F. 198. 402.), should be exhibited, and repeated until it fully operates; after which the diaphoretics may be repeated, or a moderate dose of *calomel*, with five or six grains of *camphor*, and one or two of *opium*, may be given, which should be followed, in a few hours, by an active stomachic cathartic (F. 181. 216. 266.). These means have been employed by me in several instances during the formative stage of fevers, with perfect success. But in cases where we suspect inflammatory irritation to have commenced in the alimentary canal, and during the prevalence of epidemics characterised by this complication, emetics, particularly those containing tartarised antimony and acrid purgatives, should be withheld, and the other means be resorted to, especially the *warm bath*, to which stimulating substances may be added, and frictions of the surface. Internal irritants of the digestive mucous membrane should be also abstained from in the formative stage of the exanthemata, for in them this membrane is generally irritable and injected; and it readily becomes inflamed upon the ingestion of stimulating and acrid matters; the healthy development of the eruption being thereby prevented. It is chiefly in robust constitutions, and after the operation of other causes than infection, that severe shocks, by active emetics or cathartics, are best borne; whilst the other remedies, especially camphor, calomel, and opium, warm diaphoretics and diluents, tonics with camphor and ammonia, external derivatives, and warm, mild, but efficacious purgatives, are most suitable when the morbid impression has been made by infectious emanations. This treatment may not succeed in arresting the fever, but it will seldom fail of shortening the premonitory stage, and rendering the subsequent disease more mild or of shorter duration; for it frequently is observed that, when the formative period is allowed to continue, and to develop the series of changes to which it leads when left to itself, the consequent disease assumes a very severe or dangerous form.

122. C. *The arrest of fever may be also successfully attempted*, during the stage of invasion (§ 35.), or up to the commencement of vascular reaction, or excitement; but when once this period has supervened, the fever will run a regular course, although it will often be much shortened by treatment. Fevers, I believe, caused by infection are very rarely arrested after reaction is established. The means just advised for the formative stage may likewise be tried in that of invasion; but much discrimination is requisite in the choice of means. Camphor, ammonia, and warm diaphoretics and diluents, sometimes with opium, when the head is not affected; the warm bath, the vapour or heated air bath, and frictions subse-

quently; are the most generally appropriate. In robust persons, and where terrestrial emanations have been the chief cause, a warm emetic (F. 198. 402.) and active stomachic purgatives (F. 181. 216. 266.) may also be exhibited, but they should more rarely be ventured upon in other circumstances, for the reasons just assigned: the recipes now referred to, however, will not be attended with the least risk. When there is tenderness at the epigastrium, with other signs of gastric irritation and depression of nervous power, instead of an emetic or cathartic, a large sinapism, or a warm turpentine epithem, should be placed upon this region, and over a great part of the abdomen; or, in other cases, upon the insides of the thighs; but neither of these ought to be resorted to if reaction have supervened, nor continued after it has come on.

123. ii. Curative Treatment. — The *indications* of cure in fevers are — 1st, to remove the exciting, and all other causes likely to exert an unfavourable influence on the patient, and to place him in a pure, dry, and temperate air; — 2dly, to moderate vascular action when it becomes excessive; and to impart tone and energy to the vascular system, in states of depression or exhaustion; — 3dly, to support vital power, especially when associated with imperfect reaction, or when resulting from depressed or exhausted organic nervous influence and vascular action;— and, 4thly, to remove local obstructions, congestions, determinations of blood, or predominant states of action, or other disease, in particular viscera. This last may be termed the *symptomic treatment* of fever, the others the *vital;* inasmuch as they have especial reference to the states of organic nervous power, and of vascular action.

124. In endeavouring to fulfil these indications, there are various circumstances to be kept in view, viz. — *a.* The previous health, age, and condition of the patient, in relation to the existing states of vascular action and power, and of individual functions. — *b.* The nature, intensity, and combinations of the causes of the disease, and the unfavourable influences which still continue to operate, and cannot be removed. — *c.* The manner in which different pathological states modify the operation of many of the most active medicines. — *d.* As precise a recognition as the symptoms will afford, of the ever-changing conditions of vascular action, of nervous power, and of exhalation, secretion, and excretion, during the course of the malady; and strict appropriation of the means of cure, not merely as respects their operation in health — their physiological action; but as regards their influence on disease, especially existing states of it — their therapeutical effects. The importance, and, indeed, the necessity, of attending to these circumstances in the treatment of fevers, is well illustrated by the action of antimonials, in their various forms and states. Tartarised antimony is one of the medicines most generally employed on the Continent, particularly in Italy, as a *contra-stimulant*, in what is called, by the modern Italian school, the *stimulant diathesis* of fever; and it is an excellent remedy in several forms of the disease, during the stages of excitement, in which it may be given in very large doses. But the tolerance of such doses depends mainly upon the states of vascular excitement and of vital power, and on the repetitions of the medicine; for they may be remarkably injurious in states of low action, in the very young or in the aged, in persons previously ill fed, in fevers attended with predominant affection of the digestive mucous surface, especially when of a low type and caused by infection; it often occasioning in these, especially when taken in very large quantities, serious lesion of the mucous membrane of the stomach and bowels. Keeping, therefore, these *indications* and *circumstances* in view, the treatment of fever must be directed according to its type, its particular form, its varying conditions and complications, and its existing stage or period, and with due reference to the measures which have already been adopted.

125. *A. The patient should be removed from the exciting, concurring, and consecutive causes,* and be placed in as pure and dry an atmosphere as possible, in a large well-ventilated apartment; but out of the way of currents of air, and in an equable and moderate temperature. When an elevated situation or chamber can be selected, the advantage should not be neglected, particularly in large towns. The earlier in the disease that this intention can be fulfilled the better; as the more completely the functions of respiration are performed, especially as to the changes effected by it on the blood, the less risk there will be of future vital exhaustion, and of contamination of the circulating and secreted fluids. Nor should it be overlooked that, although the pulmonary functions are imperfectly performed during the formative and invading stages, they are more or less completely restored as reaction is developed, and they often assume their accustomed activity, unless the bronchial surface, or substance of the lungs, have been inordinately affected by congestion or determination of blood during the early stages; the subsequent activity of this organ contributing to restore the impaired purity of the circulating fluids, and to prevent or counteract much of the vitiation they afterwards would experience from an impeded elimination of hurtful matters, particularly in circumstances unfavourable to the due performance of the several depurating functions, of which the lungs are themselves one of the most important, and a dry, pure and temperate air, one of the most effective agents.

126. *B. The moderation of excessive vascular action* is obviously necessary; but the particular means by which it should be effected, and the grades of action that should be interfered with, are not so evident. These are points which must not be determined by theory, but inferred from extensive experience and observation. If the patient was previously in good health; if the causes were not remarkably intense, or are imperfectly known; if the symptoms do not indicate great excess of action, or serious irritation of any particular system, or determination to any viscus, or congestion; then little need be attempted, and certainly no active means should be resorted to, especially among the poor, and persons of a spare habit of body. In the rich and well fed, or those who are more plethoric, simple saline refrigerants and diaphoretics, mild aperients, and cooling diluents and diuretics, may be employed, rather with reference to consequent changes, than as respects the existing state of disorder — to the prevention of future lesion, the removal of ob-

structions, and the preparation of the organs for salutary or critical changes. These means exert a solvent or relaxing operation upon the capillary vessels; they promote secretion, soothe vascular irritation, equalise the circulation, and facilitate the excreting actions.

127. When vascular action rises above the state just mentioned, it should be considered excessive, and more energetic remedies employed. Inordinate action varies remarkably in grade, and somewhat in kind, with the causes which induce it, with the consequent state of organic nervous power, and with the constitution, habit of body, and age of the patient, from that just noticed, to the vehement forms, which are rapidly followed by exhaustion, by a dissolved or otherwise altered condition of the blood, by lesion of capillary action and tone, and by structural change, especially in mucous surfaces and parenchymatous viscera. The most intense forms of reaction, and consequently the most rapid in their course, often have nearly passed off before the patient is brought for treatment, the effects of morbid action being then only observed, and the exact nature of the disease frequently mistaken. But in proportion as the action of the heart and the pulse are strong, frequent, full, and hard; the countenance and surface injected, turgescent, and animated; the eyes bright and prominent; respiration full, deep, and laboured; animal heat increased, or acrid and burning; the excretions diminished or suppressed; the animal functions unbroken, consistent, and free; the course of the disease, whether epidemic or sporadic, acute and rapid, and the type perfectly continued; so much the more active and immediate should be the means employed to lower the excited action on which these depend, and to prevent its dangerous tendency. — These means have been usually named from the morbid states they are employed in removing, as *antiphlogistic*, *antisthenic*, *contra-stimulant*, *refrigerant*, *lowering*, *evacuant*, *&c.*, and are very numerous; although the remedies which are appropriate to particular forms of excessive action are much more limited.

128. *a. Vascular depletions* were resorted to by the ancients, generally with the view of diminishing inordinate action, or of diverting an impetuous motion of the fluids from vital organs; and observation taught them, that, when pushed far, with an intention of curing or arresting the progress of fever, they were frequently injurious. A nearly similar practice was adopted by the best writers, from Hippocrates to Sydenham, who both illustrated it. Sydenham explicitly states, that bleeding is required to repress the tumultuous or irregular motions of nature, and remove the flux of blood from an important organ or part, to which the febrile impulse has determined it: and the ideas held respecting the practice, among judicious writers of recent times, nearly agree with the above, although they differ as to the employment of it in certain types and forms of fever. When the symptoms just stated (§ 127.) are present, bloodletting should be promptly and decidedly employed; and when the patient is removed into a pure air, beyond the influence of the causes, and is robust, plethoric, and young, it may often be carried to a great extent. This appears to have been the case with Dover's patients. His account of the treatment of the fever which broke out amongst his followers to South America was given by Dr. Franklin to Dr. Rush, and was a principal cause of the change which took place in the practice of the latter during the epidemic fever of North America in 1797. Dover was a Buccaneer leader, and no mean physician, and practised both professions much in the same spirit. He ordered bleeding to a very great extent at the commencement of the disease, — a treatment successfully adopted in our own times, under similar circumstances; and which I have resorted to in the ardent fever occurring within the tropics. In a case, wherein I directed bloodletting before reaction had supervened, the loss of three or four ounces caused profound and prolonged syncope; yet, within four hours, when reaction had come on, fifty ounces were taken before any effect was produced upon the pulse; — and before the sun of the same day had gone down, forty more were abstracted at one time, — in all, ninety-four ounces within twelve hours. But the patients for whom this practice has been prescribed with success have been young, robust, or plethoric, and removed from the continued influence of the causes which produced the disease.

129. *a.* The extent to which bloodletting should be employed, and the good effects from it, will depend on the particular form and complication the disease assumes, on circumstances peculiar to the patient, on the character of the epidemic, and on the period at which it is resorted to. It may be injurious, from being carried too far, or not far enough, — and from being resorted to before reaction has supervened, or when the reaction is about to pass into exhaustion, or in cases in which it is not indicated. Its effects will depend upon the manner in which these and other circumstances are weighed by the practitioner; but it should not be overlooked, that it depresses the vital energies much more remarkably in fever than in idiopathic inflammations; and, when inappropriately or too freely practised, it prevents or retards salutary evacuations and crises; and either disposes to unfavourable changes, or renders convalescence difficult and prolonged. Hildenbrand very justly remarks that, even in cases where the propriety of the practice is undoubted, a moderate quantity only should be taken away at one time, and the effects upon the disease, as well as the appearance of the blood, should be carefully observed, before its repetition be directed. This precaution is especially requisite at the commencement of epidemics, if depletion be employed late in the disease, and if vascular action be tumultuous, or much exceed nervous or vital power.

130. Large bloodlettings have been directed with the view of arresting or shortening the fever; and, when the person has been robust, the constitution sound, the cause not very intense, and its effects not very violent, the practice has occasionally so far succeeded as to subdue the morbid excitement down to that grade which is necessary to the restoration of the secreting and excreting functions, and the production of a salutary crisis. We sometimes observe a large or full depletion in a few hours afterwards followed by a general perspiration, and copious alvine evacuations. But this result should not be confidently calculated upon, even in the class of patients just mentioned, and least of all in fevers arising from infection

and mental anxiety, or during epidemics, however early in the stage of reaction it may be resorted to. Much discrimination is necessary, even in cases where the practice appears to be indicated, not to run a risk of mischief by having recourse to it.

131. When, in the progress of fevers, but more especially at their commencement, signs of local determination or of predominant vascular action appear in the head, lungs, or abdominal viscera, depletions, both local and general, are most requisite. If, however, these affections come on in advanced periods of the fever, although depletion to some extent is required, the existing states of vital power and action, and even of the blood itself, often forbid it to be practised nearly to the amount generally required in idiopathic inflammations,—unfavourable terminations or even gangrene rapidly supervening, owing to these states, upon a too free recourse to it; for it is not so much from excessive action, as from diminished power, and alterations of the circulating fluids, that these unfavourable results occur in the progress of fevers. The earlier, however, the predominant local disease or complications appear, the more energetically may bloodletting be employed.

132. β. The *circumstances* more especially requiring recourse to vascular depletions may be summed up as follows: — (*a*) Inordinate excitement, or irritation with rigidity of fibre, and general increase of the animal heat; — (*b*) When the patient is robust, plethoric, or young; the sanguiferous system being so surcharged as to prevent the free exercise of the functions; — (*c*) When the general reaction of the vascular system is such as to endanger vital parts, or too strong to allow a salutary or critical change, or so vehement or tumultuous as quickly to exhaust vital power; — and, (*d*) When the blood is determined to, or vascular action is inordinately increased in, an important organ. — In these *conditions* bloodletting is employed, with the following *intentions*: — α. To remove the excitement and irritation, and relax the exhaling and secreting surfaces and organs; — β. To diminish the load which oppresses the vascular system, congests it, or overpowers the organic nervous influence that actuates it; — γ. To reduce the excessive reaction, and thereby to guard important viscera, to prevent consequent exhaustion, and to favour the supervention of salutary evacuations; — δ. To remove or divert the increased impulse or action from important organs.

133. γ. *There are certain considerations and symptoms contra-indicating bloodletting*, that should not be overlooked. Some of these I have seen but too often neglected, even by old practitioners; and others so remarkably misinterpreted by them, as to have been their only reasons for having recourse to depletion, although actually the strongest indications against it. — A very frequent, soft, and open pulse seldom or never admits of depletion, for in such cases the tone of the vessels is insufficient to accommodate them to a diminution of their contents; consequently, remarkable sinking and depression, with increased rapidity of the circulation, &c., supervene. The pulse may be also open, soft, expansive, and tumultuous, indicating excessive action beyond vital power, as in certain forms of adynamic and malignant fevers attended by contamination of the circulating fluid. In this state, the loss of even a very few ounces of blood will produce bad effects. Vascular depletion is seldom well borne in fever, when the pulse ranges so high as 110, and still more rarely if it reach 115 or 120, in adults. Irritable females, however, and those in the puerperal state, offer exceptions to this.

134. Great prostration of strength and of vital power; the supine posture; languor of the eyes; paleness or collapse of countenance; a lurid complexion; a dark or flabby state of the tongue, with indentations of the teeth on its edges, or dark mucous sordes on the tongue, gums, and teeth; great sadness and depression of spirits; low delirium; tremblings of the hands, and especially of the lower jaw; a feeble, small, and weak, or an open, compressible, and undulating pulse; a frequent and hurried respiration; incontinence of fæces or urine; coldness of the extremities, or of the ears or nose; coldness or rawness of the expired air; softness and flabbiness of the soft solids; and a dirty, muddy, lurid, or discoloured appearance of the integuments; are the strongest indications against any kind of depletion, and in all circumstances of fever.

135. In addition to these, the noxious nature of the exciting causes; their concentration, and their intense operation, as in the case of infectious effluvia; imperfect ventilation, &c.; the character of certain epidemics; the continued influence of the contaminated air, or of the infectious emanations that caused the fever; previous depression and insufficient nourishment; the presentiment of an unfavourable issue, or mental distress and anxiety; the circumstance of the patient being treated in the midst of the malaria, or marshy exhalations, that caused the disease, or in an hospital, camp, house, or low street, in which infectious fever is prevalent; all militate against bloodletting, or indicate a necessity of caution in respect of it, according to the form which the disease assumes. — Vascular depletion also is not so well borne by persons living on a poor watery diet; nor by the studious and exhausted; nor by the fat, bloated, cachectic, and intemperate; nor by residenters in low marshy districts; nor by those confined in close factories, or living in close or low apartments and streets; nor by persons passed fifty; as by those differently circumstanced. But the various species of fever furnish peculiar indications in favour of or against bloodletting that will be considered in their proper places.

136. δ. *Of the repetition of bloodletting.* — Previously to determining upon a second depletion, the effects both immediately and more remotely consequent upon the first, and the character of the disease, should be most carefully studied. It may happen that the first bleeding, although small, has produced fainting, followed by so strong reaction as to render a second or even a third full or moderate bleeding indispensable. This is chiefly observed when the first has been practised too early, or before the stage of reaction has been fully developed. If the fever is complicated, and the local affection presents much of the inflammatory character; if the patient has been relieved by the former bleeding; if the pulse remains good; if reaction, or determination to an important organ be diminished, the symptoms which indicated the first depletion still persisting

o a certain degree; we may proceed to a second, but always with circumspection. If, on the contrary, the pulse becomes weak, and the strength sinks, we never ought to repeat the bleeding. In all cases, the physician should attentively observe the pulse during the flow of blood, in order instantly to assure himself of the propriety of depletion: for if it become feeble and irregular, and the patient at the same time more distressed, the evacuation should be immediately stopped. The blood drawn in the first instance sometimes furnishes indications for or against the repetition of bloodletting; but such indications should seldom be acted upon alone. The inflammatory coat, and cupping of the coagulum, are favoured by cold, dry weather, by the puerperal states, by the rheumatic diathesis, and by the blood being taken in a full stream, and in a deep and narrow vessel. — But this condition, as well as a very loose or dissolved coagulum, or imperfect separation of it from the serum, and the other states of the fluid described in the article BLOOD (§ 78. *et seq.*), should be duly considered, in connection with the other phenomena, before they can be made the basis of curative indications. VAN ROTTERDAM justly states, that when the crust consists of a delicate bluish membrane, covering a greenish gelatinous matter, the crassamentum being livid, soft, and floating in a thick and greenish serum, a second bleeding will prove most mischievous; — and I may add, that least of all should depletion be repeated, in any mode, if the colouring matter be precipitated to the bottom of the weak crassamentum, and of a blackish or purplish colour.

137. ε. *Local bloodletting* is required chiefly in very young patients, or after general depletion, or in local determinations and complications, or in circumstances that render the propriety of bloodletting doubtful. It is most serviceable when the head is affected, and then either cupping or leeches may be employed, but preferably the former, when a quantity exceeding six ounces is to be taken away; and either mode may also be adopted when the viscera in the large cavities are affected. If leeches be employed late in fever, particularly in its low and complicated forms, care should be paid to the bleeding after their removal, as it is apt to continue, and is arrested with difficulty. *Dry cupping* is sometimes useful in states of internal congestion, when the detraction of blood can hardly be risked.

138. ζ. The question has been often agitated, *How late in fever should bloodletting be practised?* but it evidently cannot be answered by any absolute rule, or without reference to the *ensemble* of existing phenomena. In the cerebral and pulmonary complications, as well as in others in some cases, bloodletting, in one mode or other, may be employed until an advanced or critical period. But reaction having come on, and the indications for it being evident, the earlier in the disease it is resorted to the better. In the stage of crises, both vascular depletion and all perturbating means should be avoided.. The indications already noticed respecting this remedy will assist the practitioner as to both the latest time of resorting to it, and the repetition of it; but in these matters, as in many besides, he must be guided chiefly by his pathological knowledge, and powers of practical observation and discrimination.

139. *b. Refrigerants*, internal and external, are of great service in moderating vascular excitement; and some of them produce this effect more than others, without lowering vital power. — *a.* The choice of *internal refrigerants* should depend upon the form fever assumes, and upon their especial action. In the early part, and more sthenic forms of excitement, sedative refrigerants should be selected, as the *nitrates of potash* or *soda* — the various *neutral salts*, the *mineral* and *vegetable acids*. Several of these may be advantageously conjoined, as a solution of the *sulphate of magnesia*, with that of the *acetate of ammonia*; and other substances, also tending to promote the exhalations and secretions, may be added. In the far-advanced stage of excitement, and in its more adynamic or low states, refrigerants which are more restorative and antiseptic — as *camphor* in small doses, the *muriate* and acetate of ammonia, the *spirit of nitric æther*, and the various *ætherial preparations*, particularly *chloric æther* — are upon the whole to be preferred; and may be conjoined with numerous other substances, according to existing morbid conditions. The refrigerant effect of several of these is only relative to the state of action at the time, but it is not the less beneficial. Thus, in the low excitement characterising adynamic fevers, or when vascular action exceeds vital power, and the heat of surface is of a morbid kind, both the vascular action and the unnatural heat are best reduced by the more restorative refrigerants, as by camphor, the muriate of ammonia, chloric æther, &c., all which may be given in conjunction (F. 431.). Much benefit will also result from a judicious choice of refrigerant beverages or *drinks* during the stage of excitement. A selection suitable to particular cases may be made from those prescribed in the APPENDIX. (See F. 592, 593, 594, 595. 915. and 916.)

140. β. *External refrigerants* are of great service, but they often require much discrimination. The patient, especially in warm weather, should be laid upon a hair mattress, covered only by a single sheet, and his surface sponged, in the more active states of febrile excitement, with cold spring water. If this be done frequently, as much benefit and much less fatigue will be experienced, than from the cold affusion, which, although more rapidly lowering the animal heat than it, hastens the return of the cutaneous reaction. If much determination to the head exist, the hair should be cut off, and *cold*, in various forms, as the *affusion* of a stream *of cold water*, evaporating lotions, &c. should be resorted to, the head being placed on a cool pillow. Formerly, there was much difficulty in regulating the temperature of the head; for, although one half of it was readily cooled by lotions, the other half was kept remarkably hot by the feather pillows in constant use. I frequently, therefore, placed under the pillow-case a folded piece of common floorcloth, which, by intervening pieces of linen, might be so managed as to carry off the excessive heat of the head, as rapidly or as slowly as could be desired. Pillows may now be filled with either air or cold water, and their temperature regulated according to circumstances.

141. In cases of determination to internal viscera, excepting to the head, the use of external refrigerants is more or less hazardous; and, if

the local complication be serious, and the general excitement of a low or adynamic form, it should be laid aside. But when this form of reaction is general, and not attended by excessive determination to, or congestion in, any of the thoracic or abdominal viscera, *tepid*, or *warm sponging* and *ablution*, will prove both useful and grateful. Whether cold, tepid, or warm sponging be adopted, the addition of subcarbonate of soda or of potash, or the sub-borate of soda, to the water thus used, will tend to relax the skin, and will cleanse it from the impurities which impede its functions. In cases accompanied by an acrid heat of surface, tepid sponging, or the tepid bath, medicated as just directed, will be advantageously followed by *frictions with sweet oil*, which, by relaxing the exhalants, will cool the surface.

142. *c. Antimonials* are amongst the most energetic *contra-stimulants* in fever; but they are not suited to all fevers, nor to all their stages. They are most serviceable in the more sthenic or inflammatory forms, in those arising from other causes than infection, in some epidemics more than others, and in the earlier periods. The best preparations are the true *James's powder* and *tartar emetic*, the former of which may be conjoined with *calomel*, and small doses of camphor, or with mild aperients; and the latter may be given in various saline solutions, or in the patient's common drink. Tartar emetic has been employed most largely in Italy to lower febrile excitement, but I believe that it will be found equally beneficial and less injurious to the digestive mucous surface when used in moderate doses. I have frequently given as much as three or four grains in the course of the day in solution; but from one to two grains has been equally serviceable. It is especially indicated when pulmonary affections supervene in the course of fever; but it should not be prescribed in low or adynamic fevers, even when thus complicated, unless with great caution, and in combinations hereafter to be noticed. A judicious use of either of these medicines early in the stage of active excitement, will often either entirely supersede depletions, or prevent the necessity of having recourse to those which are large.

143. *B. Inordinate depression of vascular action*, during the period of the disease which usually follows that of invasion, is very much less frequent than the states of excitement. It sometimes requires the most active means to remove it, but these means should have reference to the cause, and the various pathological states attending it. This condition generally arises from the intense impression of the exciting cause on the organic nervous influence, preventing thereby the evolution of vascular reaction; the stage of excitement either not following the earlier changes, or appearing in an irregular and imperfect manner. In such cases, which are most common in certain epidemics, and in some localities productive of the more concentrated states of malaria, there is generally more or less congestion of the large vessels, and parenchymatous viscera; and the vascular depression is dependent — 1st, upon lowered nervous influence; — 2dly, upon an overloaded or oppressed state of the circulating and vital organs — the state of *congestion* so strongly insisted upon by STAHL and his disciples, but which I have shown (§ 92.) not to be a primary change, as believed by more recent writers. In this case, the means advised for the stage of invasion (§ 122.) should be resorted to, especially the *heated air* or *the vapour bath*, and *warm baths*, followed by *frictions* of the surface. In some cases, especially when irregular or unavailing efforts at reaction are made, the abstraction of a few ounces of blood from a vein, whilst the patient is immersed in a warm bath, and frictions of the surface are being employed, will often assist in restoring circulation to the surface, and in removing the internal congestion. If the pulse rise during the flow of blood, a larger quantity than otherwise might be safe may be taken, or the operation may be repeated, according to the effects observed after the first evacuation. If a satisfactory result is not soon observed from these, a hot *turpentine epithem* should be placed over the epigastrium and abdomen, and covered over with oiled silk, or leather, so as to prevent evaporation; and be either kept there or renewed until erubescence of the surface is produced. In the more dangerous cases, a similar epithem may also be applied to the insides of the thighs. At the same time, moderate doses of *camphor* or *ammonia* may be given internally, in warm diluents, or small quantities of the *chlorate of potash*. Depressed vascular action, whether occurring in the early progress of the disease, or consequent upon some grade or other of excitement, being chiefly an effect of the change in the state of organic nervous power, although often associated with congestion at the commencement, and with vitiation of the circulating and secreted fluids in the latter stages, should be further combated by the measures which are required for the fulfilment of the next intention; an especial attention to these conditions being paid in the remarks about to be offered.

144. *C. To support organic nervous and vital power*, especially when associated with imperfect vascular reaction, or with a morbid state of the blood, or when proceeding from exhaustion, is of the greatest importance; but the circumstances in which the accomplishment of this intention becomes requisite, and the treatment most appropriate for it, in the various states of fever, are amongst the most difficult topics of practical medicine. In certain varieties, especially those that commence with low excitement or imperfect reaction, the debility is owing in great measure to *suppression* of power — to the overloaded state of the vascular system, consequent upon interrupted exhalation and secretion, preventing its free reaction upon its contents. In such, power is best restored by moderate vascular depletion, the pulse becoming more free and developed as the congestion and load are removed. It is in this class of cases that early evacuations are most requisite, as the best means of preserving vital power, and are the oftenest neglected; whilst in others, particularly those which are characterised by excessive action, although attended by loss of vascular tone and nervous power, or by a vitiated state of the blood, or both, depletions are inappropriate, and the most likely to be injuriously resorted to. In certain adynamic fevers, in which reaction assumes this latter form, and apparently indicates bloodletting rather than opposite means, if employed sufficiently early and with much circumspection, some advantage, or little mischief, may result from it, especially if the patient was

in health, well-fed, or at all plethoric, before the attack. But when the pulse is very quick, broad, or open, the vessel yielding on a gentle pressure of the finger, as well as before the impulse of the heart upon the column of blood in it, depletions should either not be attempted, or be accompanied with remedies which will restore nervous power. In general, however, they are in any mode hazardous in such cases; the febrile poison or cause having infected the organic nervous influence, and the vascular system, as well as its contents, and prostrated vital power in such a manner as to be roused only by tonics and restoratives. But even in these circumstances, stimulants should at first be cautiously used and judiciously selected; for a too early recourse to them, especially to such as are at all heating, may be very injurious. When this state of the circulation occurs late in the disease, or is consequent upon a more vigorous reaction, and an obviously vitiated state of the blood, the most energetic means of restoration are necessary.

145. Debility from *suppressed power* is frequent in the early periods of fever, when the brain and lungs are predominantly affected, and is best relieved by moderate depletions and derivatives. Care should be taken to distinguish this form of debility, as, whether occurring early or late, the use of stimulants would be more injurious than beneficial, unless in peculiar circumstances, and when these medicines are conjoined with other more appropriate means. The association of this state with vascular congestion, in these as well as in other cases, requires rather the treatment directed for depressed vascular action (§ 143.), than that for exhaustion.

146. It must be evident from the foregoing, therefore, that numerous circumstances must be duly considered before restoratives — either of a tonic or stimulant kind — should be resorted to in fevers. These circumstances furnish the true *indications* for the employment of them, and are chiefly the following: — *a.* The intense operation of the causes of infectious and epidemic fevers, these generally requiring, *cæteris paribus*, an earlier and more liberal use of restoratives, than those which are sporadic; — *b.* The summer and autumnal seasons; — *c.* An age past the meridian; — *d.* Imperfect nourishment and clothing; the patient having lived chiefly on vegetables, or on fish, or salt provisions, or having been addicted to ardent spirits, or to sexual indulgences; — *e.* An intermittent, remittent, or low *type* of fever, or any of its adynamic *forms*, especially if uncomplicated with any inflammatory state; — *f.* The continued operation of the poisonous effluvia which caused the disease, as in low marshy situations, the close air of crowded hospitals, &c.; — *g.* Signs of real debility or of exhaustion, especially when attended by a moist or flabby tongue, by a very soft and quick pulse, the secretions not being suppressed; — *h.* An indifferent or apathetic state of mind, despair of recovery, mental depression, &c.; — and, *i.* The symptoms enumerated above as contra-indicating bloodletting (§ 133.). Besides these, there are numerous others, which appertain more especially to certain species and forms of fever, and which will be noticed hereafter. Various circumstances may, however, arise, which will render vascular depletions, and a recourse to tonics, and even to stimulants, nearly at the same time, extremely proper. Remittents and intermittents, particularly in warm countries, and several complicated states of continued fever, often exemplify this.

147. *The selection of means* in order to support nervous and vital power must have reference to the cause and form of fever, and to existing pathological states and complications. In *endemic* fevers, the various preparations of *cinchona* and sulphate of *quinine* are upon the whole most appropriate. In those caused by *infection*, the same preparations with *camphor*, the chlorates, especially the *chlorates* of potash and soda, *serpentaria*, *arnica*, camphor with *opium*, *wine* given in *Seltzer water*, *yeast*, *carbonic acid*, various *tonic infusions* taken with the *citrate of ammonia* in a state of effervescence, *spirits of turpentine*, *pyroligneous acid*, *kréosote*, the *mineral acids* and *æthers*, especially the *muriatic* or *chloric* and *chloric æther*; and in the complicated states of fever especially, external *derivatives*, *vesicatories*, *sinapisms*, *epithems* with warm turpentine, or liniments with this latter, and camphor, capsicum, &c., are the most efficient remedies. When the blood appears contaminated, or the excretions acrid, offensive, and excoriating, combinations of tonics with antiseptics, as the decoction of cinchona with the chlorate of potash — a combination which I have used for many years with much success — or with chloric acid and chloric æther; the pyroligneous acid with kréosote; spirits of turpentine, &c.; and these, or similar substances, administered in enemata; are the most to be depended upon. But the appropriation of these and of other remedies to the particular forms and states of fever, is more fully shown in the sequel.

148. *D. The promotion of the exhalations, secretions, and excretions*, by *emetics*, *purgatives*, *diaphoretics*, and *diuretics*, is a most requisite intention in the cure of every type and form of fever. By a judicious selection of means belonging to these classes of remedies, adapted to existing pathological conditions, vascular action may be developed when it is low or suppressed, or moderated when it is excessive; nervous power may be relieved when it is oppressed, or supported when it is exhausted; and the circulating fluid may be preserved in a state of comparative purity, or relieved from the contamination it may have experienced in the course of the disease.

149. *a. Emetics* were formerly more employed in fever than at present.—SYDENHAM, STOLL, and many others, prescribed them very generally; but the recent views as to the seat of fever in the brain, and digestive mucous surface, have tended to bring them into disuse. In the early stages of the simple and sporadic forms of fever, they are often of great benefit, especially in arresting them, as advised above (§ 121, 122.), or in developing imperfect action. They are seldom productive of much service after the excitement has become fully established or stationary, and should not be employed in the cerebral complication, or when tenderness or pain are felt in the abdomen, especially at the epigastric region. When prescribed thus early, they are calculated to prevent congestions of the lungs and liver, and even to remove them at their commencement. SYDENHAM, from a fear of their effects upon the brain, seldom prescribed them until bloodletting was premised, and thereby lost much of the benefit they are

calculated to afford, inasmuch as the period at which bloodletting could be advantageous, was more advanced than that in which emetics are most serviceable. Ipecacuanha is, upon the whole, the best substance that can be used. Tartar emetic is not so safe, if there be tendency to the gastric complication, or in low infectious forms of the disease. Some authors have recommended emetics at a late period; but I have had but little experience of them later in fever than I have advised them. In the early stages I have both frequently prescribed them, and seen them prescribed with benefit. They may, however, prove beneficial in more advanced periods, especially in the bronchial complication, and to answer particular purposes; but they should be conjoined with such other substances as will assist them in answering the especial intention with which they are directed.

150. *b. Purgatives* are the most generally prescribed medicines in fever, in this country; and are at least amongst the most useful when judiciously selected. *Calomel* early in the disease, in conjunction with *James's powder*, and in the adynamic states with *camphor*, &c. —*jalap* with *cream of tartar*, in sporadic cases, — the *mild neutral salts*, or the more *cathartic salts* in mild doses, in similar circumstances, — *rhubarb* in nearly all fevers, variously combined,— *spirits of turpentine* with castor or olive oil, &c., when the head is much affected, and in certain states of the abdominal viscera; and various other mild aperients, as *manna*, *tamarinds*, prunes, &c., with the *citrates*, *tartrates*, &c.; are the most serviceable. The *phosphate of soda*, or any of the strong *neutral salts*, either alone and in small doses, or with diaphoretics and diuretics, will frequently produce both refrigerant and evacuant effects. They are indicated chiefly during the stages of excitement, more especially in sporadic and endemic fevers.

151. In general, the purgatives used in fevers should be mild, and such as are not calculated to irritate or inflame the digestive mucous surface. They should be employed with the intention — 1st, of simply removing mucous sordes and accumulations from the prima via; — 2dly, of promoting the secreting and excreting functions of the collatitious viscera, and of the intestinal surface; — and, 3dly, of thereby unloading the vascular system of a part of the effete materials conveyed into it, and liable to accumulate in, and contaminate, the blood. They should rarely or never be prescribed with a view of deriving the circulation from other parts to the digestive canal; for, in fevers, irritants of any kind acting upon this part will often react upon the brain and liver; with the exception of the purgatives just enumerated. If oils be employed, especial care should be taken that they are quite fresh, otherwise they may occasion great danger. In pulmonary complications, the addition of tartarised antimony in small doses, or of ipecacuanha, to the purgatives, will be useful, and will promote their operation. In advanced stages, the utmost discrimination is necessary in the selection of purgatives, and more especially if we dread the presence of disease of the mucous follicles. In these, doses of rhubarb sufficient to evacuate freely the bowels, with the hydrargyrum cum creta, camphor, and ipecacuanha, are most beneficial. This lesion is commonly connected with, if it be not caused by, the injurious remora of sordes or morbid secretions in the canal, and by a vitiated state of the blood; the aperients or purgatives selected should, therefore, not merely be mild, but possess tonic and antiseptic properties, or be conjoined with such substances, especially camphor, cinchona, sulphate of potash, the chlorates, or kréosote.

152. *c. Diaphoretics* should be prescribed with strict reference to the existing degree of excitement; for if the vascular action mount above a certain pitch, the cutaneous exhalation cannot be procured until it is reduced; and if it sink too low, the perspiration will either be interrupted, or become partial or clammy. In the stage of excitement, therefore, depletions and refrigerants are the most efficacious diaphoretics; or such substances as relax the skin by acting on the digestive mucous surface, as calomel with antimony, and in some forms of fever especially, with opium; or ipecacuanha with nitre and opium, &c. During this period, the more *cooling diaphoretics* should be selected, especially those mentioned under the head of *refrigerants* (§ 139.), and *emollients* and *relaxants*, will often very materially aid their operation, especially if gastric and *intestinal irritation* be present. Whenever vascular action, or vital power, particularly the latter, sinks materially, the warm or *stimulating diaphoretics*, as camphor, serpentaria, ammonia, arnica, &c., should be preferred, and be combined with tonic infusions, &c., according to the circumstances of particular cases and existing pathological states.

153. *d. Diuretics* are upon the whole less requisite in fevers, than the preceding; but they are often useful adjuncts to tonics, diaphoretics, or even to the milder purgatives. The ætherial preparations, especially the spirits of *nitric æther*, *citric acid*, and the *citrates*, the *tartrates*, and most of the *neutral salts*, and nearly all the *refrigerants* (139.), may be thus employed. They are indicated more especially in the pulmonary, cerebral, and hepatic complications of fever; those of an antiphlogistic kind being the most appropriate.

154. *e. Mercurials* are often necessary in fevers, especially calomel, blue pill, and the hydrargyrum cum creta. *Calomel* is of great service as a deobstruent purgative, in fevers arising from endemic causes, especially when the liver becomes obstructed; in conjunction with opium, after bleeding, in the gastric and other complications; and with camphor and opium, in certain malignant states, which will be particularly noticed. *Hydrargyrum cum creta* is most useful, with ipecacuanha and rhubarb, or with camphor and opium, in the intestinal affections occurring in the progress of the disease. Of the use of *mercurial frictions* in continued fevers I have not had much experience; but in periodic fevers, when the liver has become enlarged, I have directed them with advantage; using either the ointment with camphor, or the mercurial liniment with the compound camphor liniment, or one of those in the Appendix (F. 306. 311.). Mercury pushed so far as to affect the mouth or to produce *salivation*, has been considered both a prophylactic and a cure for fever. I have tried to affect the system in the most malignant forms of fever in warm climates, without succeeding; and where I have succeeded, there was every reason to believe that recovery

would have taken place nevertheless. In some complicated states of fever in this country I have given very large doses of calomel and camphor with opium every four or six hours, with success; and although recovery has taken place, as frequently without the mouth having been affected, as otherwise, I have generally considered the latter a favourable occurrence. This treatment was introduced by me about fifteen years ago, and was then resorted to in many cases in a public institution: it was taught in my lectures, and published in several periodicals ten or twelve years since. The circumstances in which it is calculated to succeed, will be pointed out hereafter. That mercury possesses no prophylactic influence against fevers, has been satisfactorily shown by several able writers, and proved by my own experience. A person, whose mouth was affected for the cure of syphilis, was seized with malignant remittent fever in Africa, in 1817, and came under my care soon after the attack. He died a few days afterwards; the most active treatment having failed in developing vascular reaction, and in supporting the vital powers. A nearly similar case is mentioned by Dr. GRAVES, in his excellent lectures. I believe, however, that instances, in which *salivation* has followed a mercurial treatment of fever, without recovery having taken place, are very rare.

155. *E. It is often necessary to remove local congestions, determinations of blood, or predominant states of vascular action, or other disease of particular viscera*, during the progress of fever, and thus to protect important viscera from injury during the febrile action. — *a*. One of the most dangerous and most frequent complications — one which does not limit itself to any particular type or form of fever, although more frequent in some localities than in others, and in some epidemics — is *predominant affection of the digestive mucous surface*, particularly of the lower part of the ilium and cæcum. This condition is more particularly noticed hereafter, with reference to its early occurrence; when it forms the mucous gastric and intestinal fevers of authors. It is chiefly to its occurrence in the advanced stages that I shall here advert. Notwithstanding the erroneous views of BROUSSAIS and his followers as to this point of pathology, we are indebted to them for the great attention which has been paid to it in recent times. Unfortunately, lesions in the small intestines may proceed to a fatal issue in fevers, without any evident sign of their existence. Those symptoms, nevertheless, which are most frequently observed, as well as those which are occasionally connected with them, should receive due attention. When, therefore, pain or tenderness are felt in the abdomen or epigastrium on pressure, with tension and burning heat, a loaded tongue with red point and edges, a soft and very quick pulse, from twelve to twenty leeches should be applied; and after the bites have bled sufficiently, a warm turpentine epithem or fomentation in the same situation will prove of great benefit. This epithem has been very frequently employed by me, since 1820, in the complicated states of fever, in both public and private practice, and has been publicly recommended by me for them on several occasions soon after that time.

156. *a*. If this complication appear early in fever, a repetition of these means will often be necessary; and, if the bowels be not sufficiently free, or if the evacuations be acrid and offensive, laxatives, especially rhubarb with the hydrargyrum cum creta, ipecacuanha, &c., and emollients or demulcents, will be necessary. If it occur very late in fever, and be attended with much depression, or *with diarrhœa*, small but frequent doses of the hydrargyrum cum creta, with camphor, ipecacuanha, and opium, ought to be given, the above epithem being also resorted to; and, if these fail, the chlorates, particulary the chlorates of potash or of lime, should be prescribed, with the preparations of cinchona, or of tormentilla; or the treatment advised for the *Asthenic Forms of* DYSENTERY (§ 88. *et seq.*) may be employed. In these latter cases, the affection of the mucous follicles is either consequent upon, or coëtaneous with, contamination of the circulating and secreted fluids; therefore the chlorates, cinchona with muriatic acid, chloric æther and opium, camphor in large doses, kréosote, and other tonic and stimulating antiseptics, are especially indicated. If dark grumous or bloody stools, and more particularly if large *discharges of blood* take place, turpentine should be administered by the mouth, and in demulcent enemata, it being the most efficacious means we possess in such circumstances, as well as when flatulent distension of the abdomen supervenes. Ulceration of the follicular glands, and softening and even sloughing of the mucous surface of the bowels, may take place in the latter stages; and, although these lesions are often preceded by the symptoms just noticed (§ 155.), and attended by evacuations indicating their occurrence, no very conclusive evidence of their existence may be observed, unless they terminate in perforation and peritonitis. This is more especially the case, when the abdominal symptoms are marked by severe cerebral affection. But ulceration may especially take place in this insidious manner also when the sensibilities are not thus obscured, and even during the periods of decline and convalescence. — These more extreme changes in the internal surface of the bowels can be met only in the manner just advised, the medicines being exhibited both by the mouth and in enemata; and by the means recommended in similar states occurring during DYSENTERY (§ 89.). — If *peritonitis* consequent upon ulceration and perforation supervene, terebinthinate epithems, or sinapisms, and large doses of opium, as advised by Dr. GRAVES and Dr. STOKES, or of camphor and opium, are the most rational means. The administration of other medicines by the mouth or by injections, or, indeed, the ingestion of any substance whatever, may increase the mischief, by its passing through the perforation, which may possibly be repaired, if the actions of the bowels be restrained by the remedies just advised; the natural processes which sometimes take place in such cases, being thereby favoured. The application even of leeches may be injurious, particularly if this occurrence take place late in, or during adynamic states of, fever, by depressing the powers of life too low for the exertion of the usual processes of reparation.

157. *β*. The *occurrence of diarrhœa*, of a mild character, the stools being feculent and not remarkably unhealthy, should not be interfered with, more especially at a critical period of the

disease. But when the symptoms of inordinate vascular determination are present, the evacuations being watery, offensive, or otherwise morbid, small doses of hydrargyrum cum creta and DOVER's powder should be given every four or five hours; and, if these fail, and more especially if the type of fever be low, the stage far advanced, and vital power depressed by the evacuation, the more active means just mentioned (§ 157.) should be administered. This complication is more common and more apt to assume a dangerous form, in some localities than in others. Thus it is more frequent and severe in Paris than in London, and in London than in Edinburgh, probably owing to the water in common use in these cities.

158. γ. When *flatulent distension* of the abdomen comes on in any of the forms of fever, but more particularly in adynamic states, PIORRY advises that an elastic tube should be introduced into the rectum, in order to carry off the flatus. I am, however, not sure that the discharge of it in this manner is so beneficial as may be supposed; and I am confident, that at the period of the disease when this is a troublesome symptom, the internal surface of the bowel will be readily injured, owing to its tender and almost softened state, even by the incautious introduction of a clyster-pipe. I have, since 1820, recommended and employed the spirits of turpentine, in cases of this kind, — by the mouth, in several forms (F. 216.), in enemata (F. 150, 151.), and in warm epithems and fomentations placed upon the abdomen. This substance is especially indicated where, with the abdominal distension, and intestinal affection, there is also delirium or coma; and is equally beneficial in a relaxed, as in a constipated state of the bowels; for, by modifying the dose and the combination, it will increase or restrain their actions, according as either effect is desired. In a remarkably dangerous, and indeed hopeless, case of this description, which I attended in 1822, with Mr. BUSHELL of Crawford Street, this medicine was resorted to with instant benefit and ultimate success; and, although I have met, both previously and subsequently to this date, with numerous instances, in public and private practice, where it has proved equally beneficial, I refer to this in preference, because it is amongst the earliest cases of the kind, of which I can find the notes, where I employed this medicine in consultation with another practitioner, — the fact thus not resting merely upon the testimony of an observer, who may be supposed to be over-partial to a medicine which he was the chief means of bringing into general use (see my *Memoirs on the Action and Use of Terebinthinate Remedies in various Diseases, in the Lond. Med. and Phys. Journ.* for July and August, 1821.), but also upon that of an equally competent observer. A nearly similar instance to that now referred to is adduced by Dr. GRAVES (*Lond. Med. and Surg. Journ.* vol. ii. p. 781.).

159. The nature and treatment of the complications of fever with intestinal disease have not always been well understood; for, as they have too frequently been considered as merely inflammatory, and not as consequences of the pathological states explained above, so have they been viewed as contra-indicating the exhibition even of mild purgatives. — This, however, is not the case: inasmuch as they may not only be occasioned by the insufficient use or neglect of these medicines, early in the disease; but also aggravated by the same cause, at a later period. The septic and irritating effects of the morbid secretions and excretions poured into the alimentary canal, and even from its own surface, during the course of adynamic fevers, when its mucous membrane possesses its minimum of tone and vital resistance, require both that the intestinal contents should not be allowed to accumulate and remain long in contact with it, and that they should be rendered less injurious by dilution and the exhibition of antiseptic substances, — indications, of which both reason and experience have shown the propriety and success.

160. *b.* The *complications of fever with severe lesions of the respiratory functions and structures* are more frequent, and often occur earlier, than generally supposed. — The influence of early impairment of these functions in the production of the consecutive phenomena of fever should of itself attract a particular attention to them during the progress of the disease. We shall generally find that, in proportion as the causes of fever act intensely upon the lungs, and impede the changes of the blood in them, the more severe and complicated will be the form of the disease, and the more disposed will this organ be to experience either manifest or concealed disorder, generally consisting of a peculiar congestive form of bronchitis, or of congestion of the lungs and bronchial lining, or of determination to these parts, or of asthenic or nervous pneumonia, passing into condensation of portions of the organ, in the lower types of fever; or of peripneumony or more purely inflammatory states of both the lungs and pleura, in the more inflammatory varieties. There are also other circumstances, which should influence the treatment of these complications, viz. — *a.* Their greater frequency in the low adynamic fevers, than in the sthenic; in the continued, than in the periodic types; and in some epidemics, seasons, and localities, than in others; — *b.* The particular stage of the fever in which they appear; — *c.* The part they seem to act in superinducing further complications, especially cerebral and hepatic affections; — and, *d.* Their particular form and character in relation to general vascular action and nervous power. It must be evident that, inasmuch as this complication may supervene, and proceed to a fatal length, without detection, especially when the brain is much affected, an attentive inquiry after it should be made by means of auscultation, through the progress of the disease, and even during convalescence.

161. *a.* In cases where the local affection, as well as the general disease, evince most of the inflammatory characters, *general* or *local depletions*, according to the circumstances of the case, are especially indicated. Of the latter, *cupping* is the most useful, especially between the shoulders, — and if leeches be applied, the glasses may be placed over the bites. In the adynamic states, local depletions only are admissible; and if leeches be used, attention should be paid to the bleeding afterwards. If further depletion cannot be ventured upon, *dry cupping* on the back or chest will sometimes be serviceable. Great advantage will also accrue from resorting to external derivation or revulsion, after sufficient depletions have been practised. The repeated application of blisters,

so as to produce merely a rubefacient effect; or of sinapisms; frictions with irritating liniments (F. 299, 300.), especially with capsicum, croton oil, &c.; and stinging with nettles; are frequently beneficial. But I have found, in numerous cases, since 1821, of both common and eruptive fevers, where these means have failed, that warm terebinthinate epithems, placed over the chest or epigastrium, or even upon the insides of the thighs, and retained or repeated until erubescence and burning heat were caused, have produced decided benefit. Such instances have occurred where I have met with other practitioners, amongst whom I may mention Mr. FAXON, Mr. BARNWELL, Mr. PAINTER, Mr. BRYANT, Mr. BYAM, Dr. T. WILLIAMS, and Mr. LEESE, who have witnessed with myself the efficacy of this application.

162. β. *Antimonials*, especially the tartar emetic solution, have been much employed in this complication; but the caution already offered respecting their use (§ 142.), particularly in the low forms of fever, should not be overlooked. The doses of tartarised antimony ought not to exceed the quantity advised above. When judiciously employed, and following moderate depletions, it is productive of great benefit, and very frequently prevents the necessity of recurring to bloodletting. In some of the states of predominant pulmonary affection, where, although occurring early in the disease, vascular depletion can hardly be ventured upon, this substance, either alone, or with camphor and small doses of squills and opium, will often prove efficacious. In such low forms of the complication, especially when supervening late in fever, even tartar emetic may not be either beneficial or indicated. In these, the external derivatives just mentioned; ipecacuanha with camphor and opium, or also with squills; the decoction of senega, and other medicines advised in the *Asthenic Form of* BRONCHITIS (§ 79. 84.); will prove most serviceable. It will sometimes become a question, whether or not wine and the more active tonics and stimulants, sometimes required at an advanced stage of adynamic fevers, should ever be administered when complicated with nervous or asthenic bronchitis or pneumonia. To this I would answer, that, having resorted to the means already advised, or merely to dry cupping, the external applications and the internal medicines just insisted upon, without benefit, vascular depletion not being further admissible, the administration of appropriate stimulants and tonics should not be longer delayed, and more especially in an advanced stage of fever, the external means being repeated and assiduously persisted in. Before, however, wine and the more heating stimulants and tonics be resorted to, the effects of camphor in full doses, or of ammonia, with opium, &c., should be fully tried. If the bronchi be loaded with accumulated mucus, and the respiratory functions thereby obviously impaired, the exhibition of an emetic (F. 198. 402.), or repetitions of it, will be serviceable, however late in the disease.

163. γ. The treatment just advised is also applicable to the more rare complication with *pleuritis*. Vascular depletions are more generally required, and may be carried to a somewhat greater extent in it, than in associated bronchial and pneumonic affections. Full doses of calomel, James's powder, and opium, are particularly indicated; and if the mouth become affected, the occurrence may be considered favourable. The external remedies should be strenuously enforced, particularly the turpentine epithem, on the outside of which a piece of soft leather or oiled silk may be laid, in order to prevent evaporation. The tartar emetic solution should also be prescribed; and the more largely, the more manifestly sthenic or inflammatory the fever and local affection; in order to economise the loss of blood.

164. *c.* The *affections of the cerebral functions*, owing to their nature, often present more prominent characters in fevers, and hence attach to themselves greater importance than they are actually entitled to. Even in cases where they have been most remarkable, the *post mortem* examination has not disclosed any lesion sufficient to account for them. The circumstance of their being more frequently caused by the state of organic nervous influence in the encephalon, and by morbid changes in the blood, and of their being often consequent upon affections of the respiratory functions and of the digestive mucous surface, has been too generally overlooked; and a treatment has consequently been adopted, more calculated to interfere with the salutary efforts of nature, than to remove morbid conditions which have actually existed. If we analyse those cases which present, in the common estimation, very prominent lesions of the cerebro-spinal functions, and compare these lesions — whether of mental manifestation or of voluntary power — with those evinced by the other organs or systems, — with the functions of digestion, assimilation, circulation (comprising the changes affected by respiration on the blood), secretion, and excretion — in what will the predominance of cerebral disorder be found to consist? and, still more, to what organ or system will the balance of morbid action incline? Keeping, therefore, this inference in view, that prominent symptoms, especially those connected with the sensitive functions, do not always prove, or truly indicate, the amount of lesion, or even its seat in the part disturbed, the cerebral complications of fever should receive a due but not an exclusive attention, even when most predominant. In proof of this position, I can appeal to no very limited experience, and to those who, like myself, have witnessed the worst forms of typhus fever, as they occurred in various parts of France and Germany soon after the peace, whether or not death was caused more by the cerebral than by the other changes, judging from an intimate analysis of the symptoms in the latter stages, and of the morbid appearances. Indeed, in many instances, the lesions of other organs were individually greater than those found within the cranium.

165. In cases of fever attended by very marked determination of blood to the head, or by vascular action increased to an inflammatory state, or by severe cerebral symptoms at advanced stages of the disease, *vascular depletions*; full doses of calomel, with purgatives, or followed by them, especially by Formula 216., and enemata (F. 140. 150.); and cold applied to the head, particularly the cold affusion on it, the rest of the body being kept moderately warm, or revulsants being applied to the lower extremities; should be promptly resorted to. Bloodlettings ought not, however, to be too implicitly confided in, for they will never of themselves remove this complication. No advantage

will accrue from opening the temporal artery or jugular vein, above that derived from bleeding from the arm; and even this will not be frequently requisite; the more especially as an equal or even greater benefit, at a less waste of blood, will result from cupping largely on the nape or over the mastoid processes, or from leeches in the latter situation and occiput. Both bleeding and the cold affusion on the head may be carried to an injurious length, especially if it be attempted to remove, or materially to benefit, within an inadequately short time, this complication; many of the phenomena of which are dependent upon, and inseparable from, the fever, and to be removed only with it. Let not, therefore, this or any other treatment be mischievously persisted in, with the mistaken view that it can accomplish what the nature of the disease renders impossible; but, at the same time, let it not be insufficiently employed. Purgatives, especially those with calomel, with James's powder, or other antimonials, should follow early depletions, particularly if this complication occurs early in the fever; and at later periods the calomel may be given with opium, every four or six hours, the bowels freely opened, and derivatives applied to the insides of the thighs or calves of the legs. As to the treatment of COMA and DELIRIUM in fever, it is unnecessary to add any thing to what I have advanced in those articles, and at other places in this. It should, however, be recollected, that other complications may coexist with predominant cerebral affection, particularly in adynamic fevers; and if this affection be very severe, or consist of delirium or coma, and more especially if it depend upon a morbid state of the blood, these complications may be thereby masked, and proceed to a fatal height before they are detected. This we have seen to be the case as respects the lungs and intestines, and it is not less so as regards the *liver* and *spleen*. Nor should the readiness with which sphacelation occurs, either from the pressure of the body, or from excoriating discharges, and inattention to cleanliness, and to the preservation of a dry state of the linen, or from blisters or injuries, be overlooked; for an early inquiry after the first indications of this occurrence will often prevent much trouble, suffering, and danger.

166. *F.* The *regimen and management of patients in fever* are much more essential to recovery than is sometimes supposed. Not only are the purity, dryness, and rapid renewal of the air deserving of attention, but also its temperature, which ought to be regulated, as well as the quantity of the bed-clothes, according to the states of vascular action and vital power. The patient should be skreened from too free a current, particularly of cool air, and especially in fevers of low excitement, as the pulmonary and, indeed, other complications may be induced by this circumstance. When excitement is fully developed, the air should be cool, and the clothes light; but in other conditions, especially when the temperature of the body does not rise above natural or is depressed below it, proportionately increased warmth is necessary, in respect of both the air and the quantity of bed-clothes. The room also should be darkened, all noise excluded, and mental excitement or irritation carefully avoided. The mouth and gums ought to be washed from time to time, and the *linen* changed very frequently; the surface of the body being sponged with simple or medicated water, of a temperature in relation to the forms of fever, as stated above (§ 140.). All the evacuations ought to be passed in the bed-pan without leaving the supine posture; and if they take place involuntarily or unconsciously, oiled silk should be placed next the bed, and folded sheets underneath the patient. Care must be taken that retention of urine or over-distension of the bladder does not occur, without being detected at once and remedied. The accounts of the nurse must not be trusted to in this, more than in other matters, but the state of the abdomen above the pubes carefully examined. If pressure cause excoriations, or threaten sloughing, measures should be immediately taken to prevent further mischief. The part may be washed, as Dr. GRAVES advises, with a solution of ten to fifteen grains of nitrate of silver in an ounce of water, or with a weak solution of the super-acetate of lead in spirits of turpentine; or with this latter and dilute pyroligneous acid; or it may be covered by defensive plasters. If sloughing occur, carrot poultices copiously sprinkled with the chlorates, particularly of lime, or with spirits of turpentine, or with kréosote, must be employed; or poultices with bark, to which either of these may be added; and pressure removed from the part and its immediate vicinity by air-pillows, or by the use of Dr. ARNOTT's hydrostatic bed. But these unpleasant occurrences should be prevented, where the appearance of the soft solids and the prostration of the patient indicate a disposition to them, by having early recourse to these latter means, and by supporting vital power by the means appropriate to existing pathological states.

167. *G.* The *food and drink in fevers* should be varied with the existing states of vascular action and power. In periodic fevers, light food may be allowed in proportion as the apyrexial period is complete. But in continued fevers, particularly during the early stages, and whilst excitement continues, no food beyond thin water gruel, fresh whey, and orangeade or lemonade, should be given. The best drinks during excitement are those prescribed in the APPENDIX (F. 592. *et seq.*), or any of the mineral acids in sugared water, and flavoured by lemon peel, or weak black tea, according as they may be congruous with the medicines prescribed internally. Thus, care should be taken not to allow the patient any of the mineral acids, when calomel, or any of the other preparations of mercury, is being taken. But when vascular reaction is low or imperfect, and vital power considerably depressed, or when the pulse is very rapid, tumultuous, and soft, Seltzer or soda water with old wine, hock, or weak punch, or wine whey, spruce beer, brisk bottled stout or brisk bottled beer, &c., according to the peculiarities of the case and the previous habits of the patient, may be allowed. If coma be present, *green tea* is one of the best beverages that can be allowed; and if the powers of life be very depressed, it may be made into a weak punch; the patient also being often roused by talking to him on lively interesting topics. He may be allowed oranges, grapes, or lemons sweetened with sugar, particularly when the mouth is foul and dry; but care should be taken that neither the pulp nor the stones are

swallowed. These will often both refresh and feed the patient as much as is necessary until the decline of the disease. If the fever be prolonged, or of a slow nervous character, very light nourishment may be allowed as the excitement subsides, such as roasted apples, jellies, in some cases asses' milk, sago, arrow-root, tapioca, wine whey, chicken or mutton broth, weak beef tea, &c.

168. *H. Convalescence* from fevers requires the utmost discrimination of the physician, and yet both the patient and his friends are but too eager to supersede his functions. The ill consequences of mismanagement in this period are chiefly — 1st, Relapse; — 2dly, Inflammatory affections of the lungs, bowels, or brain; — 3dly, Dropsical effusions; — and, 4thly, Mental alienation. These are usually caused — *a.* by the patient getting up too early from bed; — *b.* by errors in diet; — *c.* by too early exposure to the weather, to the sun's rays, to cold, malaria, &c.; — *d.* by mental excitement or irritation; — and, *e.* by premature exertion of the physical powers. Convalescence is prolonged and difficult, and the consequent risk of some one of the ill effects of mismanagement supervening proportionately great — *α.* when the fever has been unusually severe; — *β.* when it has been very promptly and actively treated at its commencement, and either quickly subdued or thereby rendered of short duration; — *γ.* when it has slowly subsided without any regular crisis; — *δ.* When it has been complicated in the severer forms stated above.

169. *I. Relapses*, as well as inflammatory or other affections of the principal viscera, are most frequently caused by getting about too soon, and by indulgence of the appetites, particularly that for food, which very generally requires restraint at this period. When the disease has been shortened by large bloodlettings, these or other ill effects, as mental alienation in persons predisposed to it, are very apt to occur. The greater is the necessity, therefore, to place the patient upon the strictest diet and regimen during convalescence. At the same time he should not be kept too low, either in respect of food or medicine; otherwise anæmia, dropsy, mental disorder, chronic debility, and rheumatism, &c. may be thereby produced. Change of air, sea voyaging, and travelling, with due precaution against cold or wet, will particularly assist recovery. If either of these cannot be adopted, the use of gentle tonics, especially when the situation is not remarkably healthy; and strict attention to the bowels, and indeed to all the secretions and excretions; are particularly necessary. The patient should not be in too great haste to remove the hair after fever, or to have it cut too close; and he should be particularly careful not to expose his head to the sun's rays. The return to his occupations — whether mental or physical — as well as to his usual food, ought to be gradual. As the cuticle and hair generally fall off after severe fevers, warm or tepid baths, when convalescence is far advanced, will promote the patient's comfort.

170. If, notwithstanding these precautions, a *relapse* takes place, the treatment should proceed according to the principles developed in this article, with reference to its cause, the progress it has made, the state of action, and of power, &c. The fact of the greatest proportion of cases of this kind being occasioned by errors in diet should not be overlooked. Hence the great success ascribed by the older writers to an *emetic* in such circumstances. Therefore, after the action of an emetic, the bowels also ought to be freely opened by a mild purgative, the operation of which may be promoted by enemata; and the treatment, in other respects, should proceed according to the type and form the disease assumes, and the stage at which our assistance is required. If a relapse is merely threatened, or if the symptoms characterising its invasion be present, the remedies just mentioned are especially indicated, with the other means above advised (§ 121, 122.) in this period. (See the art. Debility, § 36. 43. 45, 46. for still more particular directions as to the management of Convalescence, and as to the measures that ought to be adopted.)

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Those who wish a further reference to the subject may consult also the collections of BONET, MANGET, and PLOUCQUET, where comparatively few of the above works will be found, in this case, as in every other throughout the work.

XI. INTERMITTENT FEVER. SYN. — *Διαλείποντες πυρετοι*, Hippocrates and Galen; *Anetus*, Young and Good; *Kalte Fieber*, *wechelfieber*, Germ.; *Paludal Fever*, *Periodic Fever*, *Ague.*

171. DEFIN. — *The febrile phenomena running their course rapidly, observing a certain succession, usually terminating in crises, and returning after regular apyrexial intervals.*

172. Intermittents have been *divided* by modern writers — into the *quotidian*, *tertian*, *quartan*, &c.; into *vernal* and *autumnal*, — into *regular*, *erratic*, and *anomalous*, — into *simple*, *complicated*, and *masked* (FOURRIER, VAIDY, &c.). But in addition to these TYPES, which have reference merely to the *intervals* between the accessions of the paroxysms, agues assume certain FORMS or *characters*, which are still more important than they in a practical point of view. These have been variously distinguished by writers. J. P. FRANK arranges them into the *nervous*, the *gastric*, and *inflammatory*, the second and third of these, in being *complicated*, often assuming a remittent type. J. FRANK divides them into 1st, the *evident*, and, 2d, the *masked*; the former being — *a. benign*; *b. malignant*; *c. regular*; and, *d. irregular.* M. PINEL classes them

into *inflammatory, gastric, mucous, adynamic,* and *ataxic*; — M. BOISSEAU, into *benign, pernicious,* or *complicated*, and *erratic, anomalous,* or *masked*; — and Mr. ANNESLEY and the Author, into — *α.* the *simple*, or *uncomplicated*; *β.* the *inflammatory*; *γ.* the *adynamic*; *δ.* the *complicated*; and, *ε.* the *anomalous*, or *masked*. — I shall follow the same arrangement here.

173. — i. *Simple Ague — Mild, uncomplicated,* or *benign Intermittent* — appears after a longer or shorter interval from the time when the morbid impression was made by its cause upon the system. During this *formative* or premonitory stage, symptoms of disorder may be more or less manifest; but they are often very slight, or hardly discernible, until shortly before the paroxysm, which may occur suddenly or unexpectedly, with the usual *invading* symptoms (§ 35.). The *premonitory* phenomena are essentially the same in ague as have been described (§ 33.); but frequently, during the few days immediately preceding the full developement of the fit, slight fever appears, and returns about mid-day or a little before; consisting of accelerated pulse, white tongue, thirst, lassitude, and pains in the back and loins, loss of appetite, high-coloured urine, &c.

174. *a.* The *fully developed paroxysm* commences with a creeping chilliness along the spine, with languor or a sense of fatigue, paleness and slight collapse of countenance, lividity of the nails, and a feeling of universal coldness. The temperature of the surface is reduced; the skin is dry and rough, sometimes with livid patches, or spots, especially on the extremities; shiverings, tremblings, or rigors occur; and the teeth chatter. Sighing, oppression, or anxiety at the præcordia, yawning, stretchings, difficult or forced respiration, occasionally cough, and nausea, are also present. The patient complains of a constrictive pain in the head and temples; of aching of the back and loins; and of clamminess and a disagreeable taste in the mouth. The tongue is white or loaded; the appetite lost; the urine limpid, sometimes pale, and voided often; and the bowels are generally constipated. Sickness and bilious vomiting sometimes supervene and hasten the next period; the pulse is constricted, small, weak, and often accelerated; and the mental powers are weakened, or overpowered. — Such is the *cold stage*, which answers to the period of *invasion* described above (§ 35.).

175. *b.* These symptoms, having continued from half an hour to three, very rarely to four, hours, are followed by transient flushes of heat, at first alternating with rigors; by restlessness; great heat of surface; flushings and turgescence of the countenance and skin; rending headach and throbbing of the temples; by a full, strong, and free pulse; high-coloured and scanty urine, intense thirst, and most of the symptoms characterising the period of *excitement* (§ 36.), with the first part of which especially, this, the *hot stage*, corresponds.

176. *c.* After a time varying from two to eight hours, but most frequently three or four, perspiration breaks out over the forehead and breast, increases rapidly, extends over the whole body, and soon becomes profuse. All the symptoms now subside quickly; the urine being more abundant and depositing a lateritious sediment; the bowels being more readily acted upon, and the mind more composed. A sense of exhaustion only now remains, and the patient often falls asleep; and the paroxysm is at an end. This, the *sweating stage*, corresponds with the *periods* of *crises* and *decline* (§ 40, 41.). The whole *duration* of the fit varies from four to sixteen hours, the common length of it being about six or seven.

177. *A. The Types and Intermissions.*—The paroxysm, having terminated more or less completely in health, some degree of lassitude and debility usually remaining, is renewed after an interval, the duration of which constitutes the *type* of ague, — after twenty-four hours, in the *quotidian*; after forty-eight hours, in the *tertian*; and after seventy-two hours, in the *quartan* types. The most common of these is the tertian, which is considered the primary type of fever. These form the primary and *regular* types of intermittents; but there are others which are *irregular*, as the double, triple, and reduplicating tertian; the double, the triple, and reduplicating quartan, &c. Of these, the *double tertian* is the most common, and differs from the quotidian only in having, on alternate days, fits corresponding in severity, character, and duration. The *triple tertian* has two fits on one day, and one the next. A *duplicated tertian* has two paroxysms in alternate days, with one whole day of intermission. A *double quartan* has a fit on one day, a slighter fit the next, and a complete intermission on the third day; the paroxysms returning in a similar manner on the fourth and fifth. A *triple quartan* has a paroxysm on each day — on the two usual days of intermission; but, as in the case of the double tertian, the fit of each differs in character, and period of accession, so that the one returning every fourth day is alike. The *duplicated quartan* has two paroxysms on one day, with two whole days of intermission. Besides these, intervals of four, five, six, seven, or eight days may occur, or even longer periods, constituting *erratic* or *atypic* forms of ague; and may be caused by treatment, by atmospheric vicissitudes, or states of the digestive organs; but they are comparatively rare.

178. *a.* The *quotidian* usually begins in the morning, and continues the longest; having the shortest *intermission*, or period between the termination of one fit, and the commencement of the next. — *b.* The *tertian* usually appears about noon; the duration of the fit being about seven or eight hours, but that of its hot stage being often the longest. — *c.* The *quartan* commences in the afternoon (from two to five), and has the longest cold stage, and the shortest paroxysm. — *d.* The tertian is the most common, the regular quotidian the least so. — *e.* Agues are most prevalent in spring and autumn: tertians and quotidians in spring, and in adults of a sanguineous or bilious temperament; and quartans in autumn, in very young persons, in females, and in the lymphatic temperament. Tertians are the mildest and the shortest in duration; and sometimes disappear of themselves. Quartans are removed with greatest difficulty, particularly in autumn; and they occasionally continue till the following spring.

179. *B.* The longer the *apyrexial interval*, the more complete is the restoration to health; but during this period, or *intermission*, the patient often complains of weakness, of heaviness or pain of the head, of a sense of cold, want of appetite, &c.;

many of the symptoms stated above, as indicating the *formative* period of fever (§ 33.), being present. Indeed, the interval in every respect corresponds with this period. When the ague continues some time, although it may not change its type or form, as it is then prone to do, especially in warm climates, the patient becomes weaker, loses flesh, has a sallow hue, and experiences obstructions or enlargements of the spleen, liver, mesenteric glands, &c., with a deranged state of the secretions and excretions; the disease passing into the complicated states (§ 183.), or terminating as will appear hereafter (§ 189.).

180. *C.* The *conversion* of one type of ague into another often occurs: tertians and quartans changing to quotidians, or to double or triple tertians and quartans, especially when they become aggravated; and quotidians into tertians when they are somewhat ameliorated. Agues, particularly quotidians, may also be converted into remittents, or even into the continued type, by the constant operation of the exciting causes, or by other powerful determining influences; but they often assume a complicated or an irregular form in the course of transition. When the fits of a quotidian, or of a double tertian, or of a triple tertian, approach each other so closely that the one is hardly finished before the next commences, the fever has been called *sub-intrans*, or sub-intrant; and differs but little from a remittent type, excepting that the cold and sweating stages may be somewhat more marked in the former.

181. ii. *Inflammatory Ague.* — Intermittents with more or less of inflammatory excitement have been described by SYDENHAM, PRINGLE, HUXHAM, SELLE, FIZEAU, BOISSEAU, &c. Mr. ANNESLEY and the Author have shown their frequency in warm climates, especially during the cold seasons, in elevated situations; and in persons of a previously healthy constitution. They are characterised by very severe rigors in the cold stage, followed by vomitings and intense vascular reaction; unquenchable thirst; by severe and rending headach, sometimes with delirium; by great heat, and by turgescence of the countenance and of the whole surface. The reaction during the hot stage is generally attended, particularly in plethoric persons, by marked determination to, and vascular turgescence of, particular viscera, according to accessory or determining causes. The organs which thus evince a predominance of vascular action, are, the encephalon; the liver and stomach, especially in warm climates, and in autumn in cold countries; the lungs and bronchi, in some instances; and the uterine organs, in rare cases. — This form generally assumes a tertian or quotidian type; is easily removed if actively treated, owing to its common occurrence in sound constitutions; but it rapidly passes into organic change, or into the remittent or continued type, in hot climates, when neglected or improperly treated.

182. iii. *Ague with oppressed Power*, or partaking more or less of an *adynamic character*, is often met with in Europeans who have resided long in hot miasmatous countries; in debilitated persons living in low, marshy, and moist countries; and in the intemperate; but it rarely occurs in these in an uncomplicated state. Whilst vascular reaction and vital power rise above the standard presented by *simple ague*, in the *inflammatory form*; they sink more or less below it, in the *adynamic.* — The cold stage is often attended in this latter, by general tremblings, rather than by strong rigors; and is followed by nausea and vomiting; developing a burning or pungent heat of the skin, which is dry, and occasionally somewhat sallow. The pulse is very quick; the tongue loaded, and red at the edges; and the epigastrium tender and oppressed. This state nearly approaches the *gastric variety* of Continental writers. More frequently, however, this form commences with horripilations, seldom amounting to trembling or rigors; often with nausea and vomiting; fulness at the epigastrium, and headach. To these succeed increased heat, alternating at first with chills; a quick, oppressed, but not hard or full pulse; somnolency, and imperfectly developed and hot and sweating stages. — Thirst is not much increased; the heat is moderate; the skin is sallow, yellowish, or lurid; the urine citron-coloured; and the subsequent perspiration is scanty, or offensive. — This form usually assumes a quotidian, double tertian, or triple quartan type; more rarely tertian; and sometimes erratic. It commences also irregularly, either early in the morning, or in the evening, or at night. The *intervals* are attended by more or less disorder; by an unhealthy appearance of the surface, a loaded tongue, and morbid excretions. The lower grades of ague are more frequently complicated (§ 183.) than simple; or, if the latter, they soon superinduce congestions, obstructions, and organic lesions of important viscera, most frequently of the stomach and bowels, of the spleen, liver, mesenteric glands and pancreas.

183. iv. *Complicated Ague — Intermittent pernicieuse*, of the French — *Intermittentes comitatæ*, of TORTI, — the *Malignant*, of some writers — is very frequent in warm climates, and in marshy districts in the south of Europe; and is sometimes met with in parts of this country. It usually presents the preceding form as respects the states of vascular action and power, but it may assume more or less of the inflammatory character, particularly in the early paroxysms. It often has less perfect intermissions than the foregoing forms, especially after two or three paroxysms; is generally quotidian, double tertian, or triple quartan; and frequently passes into a remittent or nearly continued type, especially in Europeans who have resided long in hot countries, and in the intemperate. It appears in two ways; — *a.* primarily in a faulty constitution, or in persons with previous disorder of some important viscus, — and, *b.* as an advanced grade of either of the preceding forms. The most frequent complications are with diseases of — *α.* the digestive and biliary organs and spleen; *β.* of the thoracic viscera; *γ.* of the cerebro-spinal functions; and, *δ.* of other parts.

184. *A. With disease of the abdominal organs*, ague presents diversified symptoms, according to the viscus especially affected. — *a.* If the *stomach* be particularly diseased, severe, burning pain at the epigastrium, with tenderness, distension, nausea, and vomitings, which are increased by whatever is taken into the stomach; distressing flatulency; dry or red tongue; high-coloured and scanty urine; sallow or depressed countenance; yellow streaks around the mouth; imperfectly developed hot stage, with a sharp, quick, and contracted

pulse; pungent heat on the trunk, with little alteration or even depression of it in the extremities; intense thirst, hiccup, and headach or delirium, are commonly present. — *b.* If the *liver* is principally affected, fulness, pain, oppression, or tension at the epigastrium, right hypochondrium, and right shoulder; oppressed breathing; bilious vomiting; diarrhœa, or a dysenteric and morbid state of the stools, which are sometimes black or bloody; a jaundiced, sallow, lurid, and harsh appearance of the surface; and the other symptoms just enumerated; are complained of. — *c.* If the *bowels* are chiefly disordered, the fever assumes a dysenteric character, the evacuations being very morbid; sickness and vomiting are less urgent, or are altogether absent; and the hot and sweating stages are imperfectly formed. — *d.* If the *spleen* be diseased, more or less enlargement is very evident in the region of it; extending into the epigastrium, and over a great part of the abdomen; most of the other phenomena being also present. — These complications may co-exist, or one or two of them may predominate; but they seldom continue long without assuming still more dangerous features; and the patient sometimes dies in the cold stage. The heat of surface often passes from an acrid or pungent state, to a clammy or raw condition, as the paroxysm subsides; and the coldness or lividity of the extremities frequently continues through its imperfectly developed stages — syncope, great debility, quick, small, and weak pulse; a dry, brown, red, or raw state of the tongue; constant thirst; anxiety and oppression at the præcordia; and lastly, delirium, coma, or death, taking place.

185. *B.* The *pulmonary complication* is much less common than the abdominal; but I believe that congestion of the *bronchi* and *lungs* obtains to a greater or less extent in most forms of ague, especially in the cold stage; and that, in the more severe states, a sub-inflammatory condition, or active congestion, often exists, although in a form that can be recognised only by the aid of the stethoscope. Dr. Stokes has adverted to this in his able paper on the treatment of ague. But, in ordinary circumstances, the respiratory organs merely participate with other viscera of the large cavities in the congestion characterising the cold stage. If, however, symptoms of inflammatory, sub-inflammatory, or congestive disorder of these organs continue throughout the hot stage, the ague may be justly considered as complicated with such disorder. The symptoms, even when the pulmonary affection is most severe, are not always very decided, unless the pleura be implicated, which is seldom the case. Those of catarrh, or of bronchitis, are the most common; but the substance of the lungs may be seriously affected without much cough being present; the respiration being only short, quick, or laboured. Particular attention is therefore necessary when this symptom is complained of. The *paroxysm* of ague in this complication is usually *quotidian*, or double tertian; and, in *character*, it may be more or less inflammatory, and but rarely adynamic, unless it has continued for some time.

186. *C.* The *cerebral complication* is seldom observed in the early course of ague; but it often supervenes on the adynamic and the inflammatory forms, and upon that attended by the complications already noticed, especially the abdominal. According to the particular character which the cerebral complication during the paroxysm presents, it has been denominated the *delirious, apoplectic, lethargic, comatose, soporose, epileptic, convulsive,* or *paralytic,* these affections occasionally occurring — the delirious and comatose being the most frequent, the epileptic and paralytic much more rare. Torti, Starck, Werlhof, and Bailly, have adduced cases of the apoplectic complication; but it is rather a termination of the disease — recovery from it being rare. The convulsive state occurs chiefly in children, as observed by Stoll, especially in warm countries. These states seldom occur in this country, unless towards the close of a neglected or improperly treated ague, when the functions and state of the more important excreting organs have been overlooked. They are, however, more common in the south of Europe, as shown by the numerous cases adduced in the works of Grottanelli, Bailly, and others.

187. *D.* Besides the above, several other complications have been noticed by writers: of these the most remarkable are, the *rheumatic* and *arthritic*, the *neuralgic*, the *asthmatic*, the *nephritic*, and *uterine*. But although instances rarely occur in which these affections accompany a fully developed paroxysm of ague, they present themselves rather as masked intermittents, or without a clearly defined fit.

188. v. *Masked Ague — Simulating Intermittent — Febres Intermittentes larvatæ*, of foreign writers — may assume most diversified forms; or rather, during seasons in which intermittents are very prevalent or *epidemic*, numerous affections, especially those of the nervous system — as *neuralgia, rheumatalgia, arthritic rheumatism,* and *sciatica; gout; headach* and *hemicrania; amaurosis; toothach; otalgia; catarrh* and *asthma; palpitations; painful affection of the spleen, nephralgia, hysteria; singultus; gastralgia,* or *enteralgia,* or *colic; epistaxis;* various *disorders of the stomach;* and *paryalsis* — may put on an intermittent type. Of these, the rheumatic and neuralgic are the most common; and as they frequently are occasioned by the same causes as produce ague, acting in a less intense mode, the circumstance of their intermittent form cannot be a matter of surprise. A case of intermittent *flatulency* lately occurred to me, the quantity of flatus eructated daily from noon to three or four o'clock being enormous, the patient continuing to belch without intermission. The *type* of masked ague is generally quotidian, double tertian, or tertian, and sometimes quartan or double quartan. As in other forms, it is most common in spring and autumn, especially the former, and when easterly winds prevail; and is usually attended by more or less disorder of the digestive, biliary, and excreting organs — a successful treatment mainly depending upon attention to this circumstance.

189. vi. Consequences and Terminations of Agues. — *A.* The *Effects* of ague depend upon — *a*. the previous health and strength of the patient; — *b.* the intensity of the causes, and the duration of their action; — *c.* the continuance of the disease; — *d.* the treatment adopted; — and, *e.* the other circumstances noticed above (§ 47). Intermittents seldom continue long, even in the simple form, or return frequently, without materially

impairing the vital energy and vascular tone of the viscera of the large cavities, especially those of the abdomen. Hence arise — 1st, the complications described above; — 2dly, remittent or continued fevers, with more or less affection of particular organs, or of the circulating and secreted fluids; — 3dly, inflammations or structural change of internal viscera, superseding the periodic seizures; — 4thly, dropsical effusions; — 5thly, chronic dysentery and diarrhœa; — and, 6thly, a fatal issue, chiefly in the cold stage, owing to insurmountable congestion of the lungs, heart, liver, and spleen, or to rupture of this latter organ.

190. The congestions of these viscera, in connection with impaired organic nervous power, more especially of the liver and spleen, give rise, by frequent repetition, to enlargements, to a torpid state of the former, and consequently to engorgements of the portal vessels and of the hepatic ducts; to imperfect secretion and assimilation of the chyle absorbed and passed into the mesenteric veins; to obstructions of the mesenteric glands; to obstructed circulation and its consequences, through the veins contributing to form the portal circulation; and ultimately to an unnatural state of the blood, and structural lesions of the digestive mucous surface, and of the large secreting and excreting glands. Hence, old and complicated agues are accompanied with a sallow, sunk or bloated, and œdematous countenance; pale lips; foul, loaded tongue; yellowish, foul, or lurid skin; fulness, distension, or tenderness at the epigastrium, both hypochondria, and over the abdomen; pain and aching between or under the shoulders, and in the loins; clay-coloured, or dark, watery, offensive, and otherwise morbid stools, the bowels being more or less disordered; dark-coloured and scanty urine; great debility and dyspnœa; and a weak, irregular, and frequent pulse. If *rupture* of the spleen occur, acute pain is suddenly felt in the splenic region; with diffused fulness, pain, and tenderness of the abdomen; small frequent pulse, cold extremities, syncope, &c.

191. *B. Appearances in Fatal Cases.* — *Death* may take place either from overpowering congestions in the cold stage, or from rupture of the spleen; but it most frequently results from the superinduced disease of internal viscera, in connection with exhausted organic nervous power, and sometimes with a morbid state of the circulating fluids, particularly in the adynamic and complicated forms. The chief lesions are seated in the liver, spleen, digestive mucous surface, and lungs. — *a.* The *liver* is often enlarged; its consistence being either increased or diminished; tubercular or purulent formations being, moreover, dispersed through its substance. Increased consistence or density, softening, purulent or tubercular formations, &c. may also exist separately, or in various combinations. Engorgement of the vessels with dark blood; distension of the hepatic ducts and gall-bladder, with a dark or greenish black, thick, and viscid bile; thickening and injection of the ducts and gall-bladder, &c.; are often observed in connection with other lesions, but more especially with enlargement and softening of the substance of the viscus. — *b.* The *spleen* is often remarkably enlarged. MORGAGNI and GROTTANELLI found it to weigh eight pounds. In some localities, it occasionally reaches an enormous size. On the Gold Coast of Africa it has been found double this weight in Europeans. I saw a case in which it was nearly eleven pounds. Its envelope sometimes presents appearances of chronic inflammation — is injected, thickened, and almost cartilaginous. Its consistence internally is rarely increased; but is most frequently diminished; its structure being friable, oftener almost diffluent, or consisting of a greyish black semifluid substance, traversed by greyish fibrous shreds or fibres, and containing a sanguineous fluid of a purplish hue, or resembling wine lees. Instances have also occurred where adhesions have formed between the spleen and stomach, and between the spleen and colon in others; and the thick black blood of this viscus has been thus discharged into the digestive canal by ulceration, the matters passed from the bowels or thrown off the stomach presenting a blackish appearance (MORELLI, GASTÉ, BAILLY). — *c.* The *digestive mucous surface* is, in various parts — in the ilium, the cæcum, colon, stomach, duodenum, and œsophagus — more or less altered; often softened; injected with dark blood in patches or spots; and occasionally ecchymosed. The mucous follicles are frequently enlarged or inflamed in various parts. *Ulceration* is seldom observed, unless the disease has been complicated with diarrhœa or dysentery; and then this lesion, with thickening and softening of the coats of the bowels, especially of the cæcum and large bowels, and peritoneal injection, is generally observed. — *d.* The *mesenteric glands* are sometimes enlarged, and present signs of obstruction or of chronic inflammation; more especially when lesions of the digestive canal are very remarkable. — *e.* The *pancreas* is occasionally enlarged, in some instances so as to obstruct by its pressure the common bile-duct. — *f.* The *lungs* are sometimes congested; but seldom otherwise changed, unless pulmonary complications have existed, when similar lesions to those described above (§ 53.) are observed. — *g.* The *brain* and *its membranes* are not often much altered, unless in the comparatively rare cases in which coma has attended the fit; or apoplexy, or convulsions, or paralysis, has occurred in it; when congestion, injection of the pia mater, effusions of serum between the membranes, or in the ventricles, are the usual appearances. — *h. Dropsical effusions*, especially in the peritoneal cavity, and cellular tissue; a pale, flaccid, or softened state of the structure of the *heart;* and more or less discolouration of a yellowish, or lurid, or dirty hue; are sometimes also observed, particularly in the more adynamic or protracted cases.

192. vii. PROGNOSIS.—It is evident that an opinion as to the result of ague should depend especially upon the form and pathological condition in which it presents itself. As to these, enough has been advanced to enable the reader to form his own opinion. But, in the adynamic and complicated forms especially, and in protracted cases, the diagnosis should be more or less unfavourable, or at least very guarded. The circumstance, also, that even in more favourable states of the disease, a very dangerous complication, or structural change, may occur, ought not to be overlooked,— apoplexy, coma, paralysis, fatal congestions of abdominal or thoracic viscera, or rupture of the spleen, may supervene. The epidemic prevalence of the disease, and more particularly the influence

of the locality, should be taken into consideration. In some situations, as in this country, ague is a comparatively mild disease; whilst in others, as in some parts of Italy, Austria, Hungary, Holland, low warm countries near the sea coast, &c., they are very serious maladies.

193. viii. DIAGNOSIS. — Ague may almost insensibly pass into *remittents*, especially when it assumes the quotidian, double tertian, or triple quartan types, or the adynamic and complicated forms. But in the latter there is no complete apyrexia, and the cold and sweating stages exist very imperfectly. *Hectic fever* may be mistaken for either of these types. But in hectic the pulse is always accelerated in the intervals, whilst in ague it falls to a natural frequency. The febrile paroxysm of hectic commences in the afternoon, and the sweating stage is of long duration; in quotidians, it begins earlier, its first stage is more severe, and its last is shorter, than in hectic. In ague the countenance is sallow, and the skin muddy or discoloured; in hectic the former is flushed, and the latter clear.

194. ix. CAUSES.—*A. Remote Causes.*—*a.* The *predisposing causes* of ague are, whatever depresses the physical and mental powers, more especially the causes fully described in the article on the *Causation of* DISEASE (§ 23. 27. 30. 33. and 35.). — *b.* The *exciting causes* are chiefly, if not solely, exhalations from stagnant water, or from marshy or clayey soils — from the various sources pointed out in the article on ENDEMIC INFLUENCES (§ 5. *et seq.*). Some authors, as M. BOISSEAU and Dr. GOOD, state that agues may arise from other causes than from malaria. M. BROUSSAIS believes cold and moisture sufficient to occasion them; and M. VAIDY supposes that they may be produced by the influence of the mind and by irritation. Dr. GOOD and Mr. COOPER refer to the rare occurrence of ague in London from the commencement of the present century to 1822 or 1823, and to the frequency of the disease since this time, as a proof of other causes than malaria being in operation. But as respects London and its vicinity, changes have taken place sufficient to explain the circumstance. The streets have been Macadamised, constantly watered, and covered by a wet clayey mud; the soil surrounding the metropolis has been turned up for the purposes of building, &c., to a much greater extent since that period than formerly; and the muddy and marshy banks of the river have been unusually disturbed and inundated by the swell from the paddles of numerous steam-vessels. It should also be recollected, that the morbid impression may have been made upon the system many days or weeks before some determining or accessory cause — as exposure to cold, errors in diet, &c. — has occurred to bring it into action; and that, without such occurrence, no effect might have followed the impression produced by the specific cause of the disease. Besides, after an attack of ague, very slight causes — as cold and moisture, painful injuries; improper diet, indigestions; north-east or easterly winds, &c. — will bring it back, after months or even years have elapsed; the fully developed disease leaving the frame remarkably liable to be affected by the diffusion in the air of the smallest proportion of marshy effluvia. That agues may be caused by *infection*, has been believed by WERLHOF, CLEGHORN, MARX, FORDYCE, KORTUM, AMELUNG, AUDOUARD, and BAILLY; and instances have been adduced by them in support of the opinion. Dr. BROWN states, that he has met with cases which have led him to suspect that such was the fact. The *epidemic prevalence* of agues is, however, a better established fact, and has been admitted by most writers; the circumstances concurring to cause it being noticed in the article on EPIDEMICS.

195. *B. The proximate Cause or Nature of Agues.* —*a.* WILLIS attributed agues to a periodic fermentation in the blood; F. DELEBOË to the absorption of an acid fluid from the pancreas; and BORRELLI to irritation of the nerves, by an acrimony of their fluids. TORTI had recourse to something out of each of these three doctrines. BOERHAAVE and STOLL came nearer the truth, in viewing them as an affection of the nerves that admitted of no further explanation. SELLE and J. P. FRANK considered them to result from a peculiar irritation of the nervous system, and more especially of the nerves of the digestive organs. Dr. REIL, and M. ROCHE have entered into long and intricate explanations of the periodicity of the morbid action: the former imputing it to the intermittent character of all the organic and nutritive functions; the latter to the periodicity of the exciting cause, and to a disposition of the organisation to repeat the phenomena, it has several times experienced. M. BROUSSAIS attributed intermittents, as well as other fevers, to inflammatory action in the digestive mucous surface; and modifications of the doctrine have been offered by some who profess to belong to the same school —inflammatory irritation in some part of the digestive, or even of any of the abdominal organs, having been assigned by BOISSEAU, MONGELLAZ, &c. M. BAILLY, taking into consideration the circumstance of the localities of agues being those in which epizooties most frequently occur; and observing that, whilst the latter is always continued, the former is periodic, although the causes are manifestly the same; has come to the conclusion, that the intermittent action is owing to the periodical change from the vertical to the horizontal position, which man only experiences. All these hypotheses, however, fail of fully explaining not merely the periodicity of the several states of ague, but also their difference of type. Those who espouse the doctrine as to the origin of intermittents in inflammation of some part of the digestive organs, are met by the fact urged by TOMMASINI and others, that true inflammation is not periodic, but continued. Whilst some endeavour to get rid of the difficulty, by giving to the morbid action the name of inflammatory irritation. If, by this latter term, be meant a lower or slighter grade of increased vascular action of a part causing irritation of its nerves, a sort of amalgamation of the inflammatory and of the nervous doctrines is manifestly attempted—more or less of either being assumed, as the circumstances of particular forms of the disease may seem to require. The facts of M. MONGELLAZ as to the intermittent character of some forms of inflammation; and that recorded by Dr. ELLIOTSON, in which the bites of leeches became irritable and inflamed during a fit of ague; certainly do not prove the cause of ague to be inflammation, but merely what *à priori* reasoning, and a full recognition of the phenomena connected with the disease, might suggest; namely, that

either pre-existing or superinduced inflammation, if it be not sufficiently intense to supersede the intermittent type, will be aggravated during the paroxysm, especially the hot stage of it.

196. *b.* From attentive observation of the disease in localities the most fertile in its cause, I conclude — (*a*) That paludal exhalations act in the manner already stated (§ 95.), and especially affect the nervous system of organic life ; — (*b*) That consequently the organs, which are especially actuated by this system, experience the chief effects of the morbid action ; the functions of circulation, calorification, digestion, secretion, assimilation, and excretion, evincing the principal disorder, and the organs performing these functions the chief lesions in protracted, or fatal cases, as shown by the appearances described above (§ 191.) ; — (*c*) That where, owing to the speciality of the exciting cause, and the intensity or continuance of its operation, its peculiar impression is fully made upon the organic nervous system, either pre-existing, or superinduced disease, inflammatory or even structural, if existing in a slight degree, or in a chronic form, will not supersede the periodic or intermittent type ; but if such disease be acute or active, or associated with high irritability of fibre and vascular plethora, the type will be either continued or remittent, or change from the intermittent to either of these types ; — (*d*) That a similar conversion of type will result from contamination of the circulating and secreted fluids when it reaches a considerable height ; — (*e*) That, in localities productive of malaria, the slighter diseases, especially those consisting chiefly of disordered function, or of altered sensibility, assume more or less of the intermittent type ; only the most acute maladies, or those of altered structure, or attended by contamination of the blood, assuming a purely continued course ; — (*f*) After viewing the effects of malaria arising from the various sources pointed out in the article on Endemic Influences (§ 5.), on the human frame, in the various epochs of existence ; after considering the nature of the agents by which such effects may be counteracted, or removed ; and after the experience of the primary and consecutive action of this particular cause upon my own system ; I believe that it has a primary, specific, and uniform tendency to impair the energy of all the vital manifestations ; — (*g*) That the morbid impression having been made by it, and the formative changes having reached that pitch necessary to the production of the cold stage, the consecutive alterations proceed in the manner stated above (§ 101.), but much more rapidly and imperfectly, and in a way insufficient to efface the primary morbid impression made by the cause upon the organic nervous system ; consequently the morbid state of this system is little affected by the successive changes characterising the paroxysm ; and, continuing the same after, as it was before the fit, is equally efficient in operating a return, after an interval of varying but of short duration, of the same succession of phenomena.

197. From this last inference, and from previous observations, it will appear, that each paroxysm is a complete febrile seizure, the successive and critical changes of which are insufficient in most instances for the restoration of health ; that the disorder remaining after the subsidence of the fit is in every respect similar to that characterising the formative or premonitory stage of fevers generally ; and that it is necessary to the cure of the disease, that it should be treated in a nearly similar manner. This view is supported by the fact of relapses of continued fevers being common, when their duration is shortened by an active or very depletory treatment at their commencement. As to the periodicity of the return, or the relapse, of the febrile paroxysm in ague, it seems to be the consequence of the specific nature of the exciting cause, of the morbid impression made by it upon the organic nervous system ; and of the continuance of this impression, or rather of the morbid state it occasions ; for, as long as the morbid condition of this system is uneffaced by treatment, change of air, or by the full evolution of critical changes, it operates a return of the febrile paroxysm after an interval, which may be prolonged or shortened by the state of vital power, and peculiarity of temperament or diathesis. As to any further explanation of the matter, I can add nothing to what is given in the article Disease (§ 155 — 157.).

198. *c.* The *consecutive changes*, and the *low or complicated forms of ague*, are manifest consequences of repeated seizures, or returns of the disease, in connection with predisposition, and with the intensity and continued operation of the cause. Owing to the impaired tonicity of the vessels, consequent upon depressed vital power, and to the frequent returns or severity of the cold stage, congestions, and subsequently torpor, obstruction, and organic change, of internal viscera, often take place ; the large vessels becoming engorged, and the cavities of the heart itself sometimes softened, or distended, and enlarged. — The changes observed in the digestive mucous surface are chiefly attributable to the same causes, and to the morbid condition of the biliary and pancreatic secretions. The low or adynamic forms are evidently results of the intensity of the cause in relation to predisposition and the state of system — of the continued operation of the cause, as when the patient cannot be removed from the locality productive of the malaria — of complications supervening in the course of the disease — and of changes in the circulating and secreted fluids.

199. x. Treatment. — Ague is treated with comparative ease and success, when the patient is removed into a pure air, and when it is neither complicated nor of a low grade. If removal is impracticable, it is often very difficult to manage, and dangerous as respects its consequences or sequelæ, although an unfavourable result may be long deferred.—The treatment, however, in either case, naturally divides itself into that applicable — *a.* to *the paroxysm*,—*b.* to *the interval*, — and, *c.* to *the effects* often consequent upon repeated attacks.

200. *A. During the paroxysm.*— The principal *intentions* that should be kept in view in the treatment of the fit, are — 1st, to guard important viscera from injurious congestions during the cold stage ; 2dly, to protect internal organs from the effects of excessive or inflammatory reaction in the hot stage ; and, 3dly, to promote an abundant perspiration in the sweating stage, whereby the vascular system and the internal viscera may be relieved.

201. *a. Treatment of simple ague.*—The means advised by Stoll are here generally sufficient.

He employed warm diaphoretics, and external warmth, in the cold stage; refrigerants during the hot stage, and bloodletting if the patient was plethoric; and diluents and diaphoretics in the sweating stage. In some cases, a warm emetic (F. 198. 402.), administered at the commencement of the cold stage, is of essential service, especially when the biliary secretion requires to be promoted.— *Emetics* at the beginning of the fit have been strongly recommended by De Bourges, Cleghorn, Huxham, Murray, Cullen, Trnka, Otto, and Thomson; but, although they may be serviceable in any of the forms of the disease, it is chiefly in the simple ague that they are unattended by any risk. They are contra-indicated by tenderness in the epigastrium or hypochondria; but in other circumstances they usually shorten the cold stage, and render the paroxysm milder. In slight attacks, when no particular viscus is predominantly affected, and the patient is neither very plethoric, nor much debilitated, and the disease has not been of long continuance, little further than diluents and diaphoretics, to promote the sweating stage, is necessary, until the intermission; when the usual means to arrest the disease are to be employed.

202. *b.* In the *more inflammatory form*, and in plethoric or athletic persons, especially in spring, *bloodletting*, general or local, or both, is necessary: if determinations to the lungs, head, or liver be remarkable, it should not be dispensed with; and still more especially if the paroxysms be prolonged and the apyrexia incomplete, — as these circumstances indicate the supervention of visceral inflammation. In these cases, the depletion may be practised in the hot stage, especially at its commencement, and when important parts are threatened by the severity of reaction; although in some instances it is better deferred until the interval, when the state of disorder and the effects of the evacuation may be more justly estimated, than during the tumult of reaction. Dr. Mackintosh, however, advises it to be resorted to in the cold stage; and in cases of the kind now being considered, or when congestion is great, in plethoric persons, it may be safely and beneficially practised. But in ordinary circumstances, or in the lower forms of the disease, I believe it to be a hazardous remedy in this particular stage. This opinion is substantially the same as that which Dr. W. Stokes has stated, after the full trial which he and Mr. Gill gave the practice. Cooling diaphoretics and diluents with diuretics, especially the tartrate of antimony, nitrate of potash, liquor ammoniæ acetatis, &c., are all the additional means usually required.

203. *c.* In the *low or adynamic form of ague*, a warm emetic (F. 198. 402.) should be given only at the commencement of the cold stage, and when indications of inflammatory action in the stomach or liver are absent.—*Warm diaphoretics* and antispasmodics in this stage, the *warm bath* followed by frictions of the surface and of the extremities, and the *vapour bath*, often shorten the hot stage, and give rise to a profuse and salutary perspiration. In several countries, the vapour bath at the beginning of the fit constitutes the chief, and almost the only, remedy against the disease; the copious perspiration following it, removing internal congestions and proving a perfect crisis. — If the paroxysm be attended by great fulness, and tenderness at the epigastrium and hypochondria, *local depletions* should be resorted to in a decided manner, and *hot fomentations* afterwards applied. Where this practice has been already employed; or where the states of vascular action and vital power contra-indicate it, — which, however, will seldom be the case as long as the disease retains its periodic type; or even immediately after local depletions; a *mustard poultice*, or the *warm turpentine epithem*, should be placed over the stomach and abdomen, and retained or renewed until it cannot be longer endured, or until a copious perspiration is thereby produced; the latter application especially causing an abundant and salutary sweat. During the course of the paroxysm, *diaphoretics* should be freely administered with small or moderate doses of *opium*; camphor, ammonia, æther, warm wine whey, &c., may be also used with this intention. If great irritability of the stomach be present, the external means just advised will relieve it; or a large dose of *calomel* with *opium*, or with *camphor*, also, will have the effect.

204. *d.* The *paroxysm of complicated ague* is often irregular, the hot and sweating stages imperfect, and the intermissions incomplete, the disease assuming the characters commonly called *sub-intrant* (§ 180.). The cold stage is also frequently severe or protracted. In these, particularly at the commencement, the *warm* or *vapour bath* is a valuable remedy; especially in the lower and more congestive forms. If the complication be of an inflammatory nature; and if the lungs, liver, stomach, or head, be predominantly affected; general or local depletions, or both, should not be dispensed with. The circumstance of the hot stage being imperfectly developed, is no proof that internal inflammation or structural change may not be present; but is the strongest evidence of the existence either of these, or of congestion, and the most conclusive argument for vascular depletions and the external applications mentioned above (§ 203.). If inflammatory excitement be developed within the head, during the fit; or if delirium, or coma, with increased heat of the scalp, be present; the affusion of cold water on it, or cold applications, should not be neglected. If the disease be not only complicated, but also adynamic, a combination of the means advised in this and the preceding paragraph, according to the predominance of vascular determination, and of impaired vital power, will be necessary. — If *diarrhœa* or *dysenteric symptoms* exist, the internal and external means, already advised (§ 203.), especially the vapour bath, the warm epithems, the combination of diaphoretics with opium, &c., will be most appropriate.

205. *B. Treatment in the intermissions.* — Having by the above means, prescribed appropriately to the different forms and states of the disease, conducted the paroxysm to a safe conclusion, the next object is to *prevent its return.* — Our endeavours to fulfil this intention should be equally strenuous in all the forms of ague; for, although the fit has been slight, a much severer one may follow. Even a comparatively and apparently slight paroxysm may produce almost irremediable mischief in an important viscus; and, however mild, its frequent return often occasions serious structural change.

206. *a.* After the paroxysm, and especially if the disease be recent, an *emetic* should be administered, and its operation promoted by diluents. If it have been given at the beginning of the fit, and acted freely, it may be dispensed with now. But it should not be administered if symptoms of determination to the brain, or of inflammatory action of the stomach, liver, or spleen, be present. After its full operation, a large dose of *calomel* — from ten to twenty grains — ought to be given; and, about four or five hours afterwards, a *purgative* draught. If these act not sufficiently in a few hours, a cathartic enema should be exhibited. Having removed local congestions or general plethora by *depletions*, and evacuated morbid secretions and fæcal accumulations, *cinchona* or the *sulphate* of *quinine* may be exhibited, to prevent the return of the fit. These are almost indispensable preliminaries to the quinine or bark, especially in the complicated and congestive forms: for, without them, it will either not be retained on the stomach; or, if retained, will convert congestions, or slight forms of inflammatory irritation, to active inflammation, or to structural change.

207. *b.* If the stomach remain irritable after the fit; or if pain or tenderness at the epigastrium, with other symptoms of inflammatory irritation or congestion, be present; the full dose of calomel, either alone or with opium, ought not to be withheld; for, as Mr. ANNESLEY has shown by his instructive experiments (*Sketches of the Diseases of India, &c.* 2d ed. p. 374.), this remedy has the effect, in large doses, of diminishing vascular action in the stomach and in the upper portions of the intestinal canal. When prescribed after depletions, general or local, and the external measures described above (§203.), the internal disorder will be removed, and the quinine, which is almost indispensable to the arrest of the disease, will be retained without uneasiness. If *quinine*, especially its sulphate, cannot be procured, the *bark* in substance, in large doses, must be substituted; and conjoined with ammonia, or camphor, capsicum, or opium, &c., shortly before the expected accession of the paroxysm. The decoction with serpentaria, the extract, or the compound tincture, may likewise be employed, but chiefly as an adjuvant. In every state of the disease, during the exhibition of quinine or bark, the excretions demand attention: a full dose of calomel, especially in warm countries, ought to be given from time to time, and followed by active purgatives and enemata. If the alvine excretions, and the biliary and other secretions, be not freely promoted during the exhibition of bark or quinine, great risk of superinducing inflammation, congestion, obstruction, and enlargement of the abdominal viscera, or violent determination to the head, will be incurred.

208. *c.* If the disease have been of long standing, congestion, obstruction, or enlargement, or chronic inflammatory action in some abdominal organ, has probably taken place. In these, the immediate use of *bark* or of quinine will be of doubtful efficacy. The treatment should therefore be commenced with sufficient local depletions, followed by the external mean salready noticed (§ 203.), and by the repeated exhibition of purgatives, a full dose of calomel having been premised and given again at bed-time, as circumstances may require. This treatment is especially indicated in those more severe cases in which the intermissions are imperfect, the tongue much loaded, and fulness, distension, or uneasiness in the upper regions of the abdomen, are complained of. Morbid secretions and local disorder being removed by these means, the sulphate of quinine or bark should be prescribed, at first either with purgatives, or alternately with those which will act decidedly. It is chiefly to a neglect of this practice that complications and unfavourable consequences so often follow the use of bark, quinine, or of arsenic; for these often interrupt excretion, and over-excite and inflame loaded, obstructed, or congested organs.

209. *d.* When the patient cannot be removed from the continued influence of malaria during the treatment, we must nevertheless trust to the energetic employment of the above means; thereby removing morbid secretions, improving the secreting and excreting functions, subduing local disease, and making a powerful tonic impression upon the organic nervous system and digestive organs. With this last view, the doses of quinine or bark should be as large as the stomach will bear, and exhibited shortly before the expected return of the paroxysm, or immediately after the sweating stage, when the intermissions are short or incomplete. Its effects will often be promoted, and it will not so readily offend the stomach, if it be given with camphor, opium, capsicum, pepper, cinnamon, &c., according to the peculiarities of the case. In these circumstances, as well as when the disease presents an adynamic form, or is more or less complicated, especially when the tongue is much loaded, or flabby and pale, the paroxysms prolonged, and the intermissions imperfect, calomel, in full doses, at bed-time, either alone, or with James's powder or opium; a warm stomachic purgative the following morning (F. 216. 266.), thereby procuring three or four evacuations daily; and the quinine alone, or combined in the manner just stated, during the intermissions, or until the accession of the cold stage; are most to be depended upon. If the spleen be much enlarged, and the patient subjected to the enervating influence of malaria, calomel must be given with greater caution, and its effects watched. In such circumstances, the purgatives selected should be prescribed with a tonic; as, the sulphate of quinine with the sulphate of magnesia; the decoction of bark with the sulphate of magnesia and the tincture of senna, or with the compound decoction of aloes; or the compound infusion of gentian, or the infusion or decoction of cinchona with the infusion of senna, and warm tinctures.

210. *e.* In cases of protracted, irregular, complicated and reduplicating ague, as well as in those of a low form, and in those occasionally following remittents or continued fever in warm climates, the *liver*, *spleen*, and *digestive mucous surface*, are generally more or less diseased. The intermissions, even when distinct or perfect, are accompanied with great languor, general uneasiness, want of appetite, a foul or loaded tongue, a sense of oppression in the epigastrium and hypochondria, and unhealthy countenance and skin; the upper abdominal regions being often full, tumefied, or tense. Here, local depletions, if they be not contra-indicated, and calomel, followed by purgatives, as already advised, should precede the exhibition of quinine. We must not, however,

wait for the removal of these signs of congestion and obstruction, before resorting to quinine or the bark; for the patient may sink too low, and vital power become insufficient to resist the progress of disorganisation. It should therefore be given as soon as free evacuations have been procured, and the tongue begins to clean. As long as the tongue is moist, the circumstance of its being loaded must not prevent the administration of quinine, if it be otherwise indicated; but it should be conjoined with a purgative, or the latter ought to be given in the intervals between its exhibition. In ordinary circumstances, I have prescribed calomel, or blue pill, with or without opium, at bed-time; an active and stomachic cathartic early in the morning; and quinine or the bark in a large dose, with camphor, &c., shortly before the return of the fit, or soon after the subsidence of it, when the intermissions are short.

211. *f.* When the *liver* becomes enlarged, and more especially if it be also tender or painful on examination, *local depletions* followed by *fomentations* and *poultices;* in some instances by the *turpentine epithem;* in others by *blisters,* and a judicious employment of *purgatives,* and of the *bark* or *quinine*; as circumstances may warrant, are indispensable. In most instances of enlargement of the liver consequent upon ague, purgatives, if appropriately combined, and firmly persisted in, have a most remarkable and beneficial effect. If enlargement be connected with torpid function, or if the latter only be present, the *mercurial ointment with camphor* may be rubbed over the hypochondrium; or a large plaster formed of the *emplastrum ammoniaci cum hydrargyro,* or of it and the *emplastrum picis,* or the warm *nitro-muriatic lotion,* may be applied over the hypochondrium and epigastrium. An *issue* or *seton* in the right side may also be resorted to if the above fail. In cases of enlargement of the *spleen,* in addition to the use of tonics and purgatives conjoined, the *turpentine epithem,* or the *plaster,* or the *lotion* just mentioned, may also be tried. In all cases of ague, and especially in the protracted, the adynamic, and the complicated, the excretions, particularly those from the bowels, should be carefully and daily examined; and from these, from the appearance of the tongue, the hue of the skin and countenance, and the state of the abdominal regions, should our therapeutical inferences chiefly be drawn. The presence, however, of enlargement of the liver and spleen, especially the latter, although requiring other and appropriate remedies, must not prevent us from having recourse to quinine; for the ague must be removed as soon as possible, in order that its repeated return may not increase the local affection; and as soon as this object is attained, the local disorder will the more readily yield to proper means.

212. *C. Remedies employed to prevent the return of the fit.* — The most certain of these, quinine and bark, have been already noticed. But numerous other substances have a similar operation, although in a much slighter degree. Indeed, any substance which stimulates, in a more or less permanent manner, the nervous system of organic life, tends to efface or to supersede the morbid state or impression made upon this system by the exciting cause of the disease. Hence stimulants and antispasmodics have a febrifuge action, although in a much less degree than bark; and even affections of the mind of an exciting kind exert a similar influence; whilst the depressing passions increase the malady, tend to complicate it, and cause an earlier as well as a severe return of the paroxysm.

213. *a. Cinchona,* or *Peruvian bark,* was brought to Spain in 1632, and came into use in England in or about 1655. It soon afterwards fell into discredit, so that CROMWELL died of ague without the exhibition of it. According to Sir G. BAKER, Drs. PREJEAN, BRADY, and WILLIS, countenanced its employment; but STURMIUS (*Febrifugi Peruviani Vindiciarum, Pars prior.* Antw. 1659) first established its reputation. SYDENHAM, MORTON, and LISTER extended it in this country, and ascertained the circumstances in which it was most beneficial. The preparation of *quinine* and *cinchonine* from the bark, and the combination of the former with sulphuric acid—the *sulphate of quinine*—has been one of the greatest triumphs of pharmaceutical chemistry. This latter substance has, since 1820, in most instances of ague, superseded the bark, as the small dose in which it is exhibited — from two to ten grains — renders it less offensive to the palate and stomach. After morbid matters have been evacuated from the bowels, it may be given in a full dose — six or eight grains — immediately after the fit, or shortly before its return; or a large dose followed by smaller doses every three or four hours; or the latter by the former, may be exhibited. Inflammatory or congestive complications do not contraindicate its use, as shown above, if the requisite evacuations have been practised; for, in ague especially, the almost simultaneous employment of depletions, purgatives, and quinine, is often both appropriate and beneficial. The quinine or bark should be continued, and the digestive functions carefully attended to, for a considerable time after the disappearance of the fits. In cases where even the sulphate of quinine cannot be taken in sufficient quantity without offending the stomach, M. De MARTIN (*Rév. Médicale,* Sept. 1827.) has shown that it may be applied efficaciously to the skin denuded of the cuticle, having reduced it to very fine powder and mixed it in cerate. It thus is absorbed into the circulation, and acts upon the organic nervous system through the medium of the vascular system, with which the former is so intimately associated.

214. *b.* Dr. FOWLER's solution of *arsenic* holds the next place to quinine or bark in the cure of ague. Dr. BROWN advises it in preference to quinine, when ague is attended by inflammatory determinations. This may be the case, but I have found quinine, employed as above directed, or given in solution with a neutral sulphate, as that of soda or magnesia, equally beneficial in such cases with the arsenical solution. The dose of this solution should not exceed twelve drops, given every four hours during the intermission, either alone, or with a few drops of laudanum, or with the tincture of hyoscyamus. The *sulphate of zinc,* in doses of two or three grains every four hours, or as much as the stomach will bear, is also efficacious; but chiefly in mild cases, or when inflammatory action is present. It was much praised by Sir G. BLANE, and is the best emetic that can be prescribed in the disease. The *muriate of ammonia* is also capable of arresting the fits, and is best given in an infusion

of cinchona, or of orange peel, or of cloves, in as large doses as the stomach will retain. It was much employed by Muys, Werlhof, Senac, Pringle, and Brocklesby; and is most appropriate to the inflammatory states of ague. Morton gave a scruple of *chamomile flowers*, ten grains of salt of wormwood, and as much of the calx of antimony, every sixth hour; Dr. Heberden, *myrrh* in large doses; and Dr. Cullen, *tormentil* and *gentian* with *galls*.

215. *c*. The preparations of *iron* have been employed, especially the *ferrum ammoniatum*, by Stahl, Triller, Huxham, and Hartmann. The *prussiate of iron* has lately been strongly recommended by Zollickoffer, who prescribed it in doses of four grains twice or thrice daily. — The sub-nitrate of *bismuth* has likewise been given by Henkesen; *phosphorus* with bark, by Hufeland; the flower of *sulphur*, in full or large doses, by Riverius and De Haen; powdered *carbon*, in doses of two drachms, shortly before the fit, by Pierquin; *ammoniated copper*, by M'Causland, Bianchi, and Brera; Dippel's *animal oil*, by Werlhof and Haller; and *cobweb*, by Paulini, Grant, and Jackson.—I have given the *chlorate* of potash with benefit in the decoction of bark, and in the infusion of valerian, with a little tincture of capsicum.

216. *d*. The *barks* of various astringent, tonic, and aromatic trees and plants have been tried, both before the introduction of the *cinchona* into practice, and subsequently as a substitute for it. The most esteemed of these are the *willow bark*. This substance was prescribed by Closius, Günz, Stone, Resenblad, Thilenius, Hilscher, James, Styx, and White; the *angustura bark*, by Wilkinson and Brande; the bark of the *Swietenia febrifuga*, by Roxburgh; *cascarilla bark*, by Hecker and others; the *pomegranate bark*, by Rehmann; the bark of the *Ilex aquifolium*, by Rousseau; the barks of the *chestnut tree*, of the *elm*, and of the *oak*, by various writers; and the *carapa* bark of South America, which has been said to have succeeded where cinchona had failed. Various other stimulating, aromatic, and tonic vegetables, have been employed, and some of them are still in use, either as adjuvants of the bark, or of quinine; or in the form of infusion, as vehicles for other substances. The most useful of these are *quassia*; *serpentaria* (Lysons, &c.); *Calamus aromaticus* (Gulbrand, Moseley, and Horn); *arnica* (Aaskow, &c.); and *Capsicum annuum* (Bergius and myself). — *Ammonia, camphor*, the *æthers, castor, musk, myrrh, ginger, black pepper, garlic, mustard seed*, &c. have likewise been employed, chiefly as adjuncts to more permanent stimulants and tonics, or in large doses with opium, shortly before the accession of the fit. Of these, the most serviceable are *camphor* and *ammonia*. *Piperin*, the active principle of black pepper, has been lately employed by Bertini, Gordini, and others, in doses of one or two grains, to arrest the paroxysms; and *salacina*, an alkaloid found in willow bark, has been very recently recommended as a substitute for quinine. *Ignatius's bean*, and the preparations of *nux vomica*, were formerly used against ague, by Paullini, Bourieu, Aaskow, Cullen, Horn, and Fouquier; and their active principle, *strychnine*, may also be found useful in the lower grades of the disease, especially when complicated with *diarrhœa*; in which, as well as in the *dysenteric* complication, the tormentil, ipecacuanha, Dover's powder, the hydrargyrum cum creta, and opium, are useful adjuncts to other medicines.

217. *e*. The *mineral acids*, especially the *muriatic* and *nitro-muriatic*, have been given in the decoction of bark, especially when the liver or spleen have been enlarged. I have employed the latter in such cases; and, in a state of very weak solution, as a common beverage for the patient during the intermissions. The *sulphuric acid*, similarly exhibited, has been recommended by Storck and Joerdens. It is an useful adjunct to the sulphate of quinine. The *citric* and *acetic acids* have been directed, but chiefly as an addition to the drink taken in the hot stage, in which, however, acid drinks should not be taken, as they tend to diminish the perspiration, which is more or less salutary. — *Æthers*, especially the sulphuric and muriatic, have also been prescribed in large doses, either alone, or with camphor and opium, shortly before the paroxysm, with the view of shortening the cold stage (Hoffmann, Clutton, and Davidson). — The *volatile alkali* has been likewise employed, similarly combined, and with the same intention; and the various preparations of *antimony* have been given before and during the paroxysm, and throughout the intermissions, in conjunction with bark or other febrifuge tonics. *Alum* was at one time much used in ague, it having been recommended by Ettmüller, Lindt, Mueller, and others. Lange and De Meza prescribed it with aromatics, and sulphuric acid, or æther; and Adair, with cinchona. — The *sulphate of iron* has been tried by several writers; but is of inferior efficacy to the sulphate of zinc, or to the *tincture of the muriate of iron*. The *Prinos verticillatus*, and the bark of the *Prunus Virginiana*, and *P. silvestris*, have been mentioned in favourable terms by Barton and other writers; the bark of the *pine*, by Berzelius; and *valerian* and *gentian*, by Vaidy and others.

218. *f*. *Anodynes* have been used in conjunction with, and as adjuvants of, antispasmodics, stimulants, and diaphoretics. *Opium* has been exhibited with these, and with antimonials, shortly before the fit, by M'Causland, Breda, and Thomann; with *camphor*, by Senac and Amelung; with ipecacuanha and nitre, by Dover; and with aloes and camphor, by Audouard. The extract of *belladonna* has been prescribed with bark and other tonics, by Hufeland and Erdmann; the *Lauro-cerasus*, by Brown Langrish; *bitter almonds*, by Bergius; and the powdered leaves of the *Laurus nobilis*, by Sir G. Baker, given in doses of two scruples, in bitter decoctions, shortly before the paroxysm.

219. *g*. In old and protracted cases, attended by infarction of the abdominal viscera, *mercurials*, especially calomel, have been employed in frequent doses, until slight salivation was produced, by Willis, Stahl, Baker, and Lysons; and the propriety of the practice, in some circumstances, is confirmed by more modern experience.—In similar cases, repeated *frictions* of the surface have proved serviceable, especially with some one of the liniments prescribed in the Appendix (F. 299. 311.). Frictions along the spine, with stimulating substances, have been advised by Hautesierk, Van Swieten, De Haen, Trnka, and others: *rubefacients* and *blisters* over the epigastrium and

upper regions of the abdomen have been directed by **Kortum**, **Schlegel**, and the writers just quoted; and are of essential benefit in congestions, inflammatory irritations, or obstructions of the abdominal viscera, and in the low forms of the disease. Frictions with the *antimonial ointment* have been preferred by M. **Peysson**. Compression of the lower extremities by ligatures shortly before the paroxysm has been advised by **Trotter** and **Kellie**; and the *cold-bath* during the intermissions has received, since the appearance of the work of Dr. **Currie**, numerous and often indiscriminating trials. In the simple form of ague, or during convalescence, when the practitioner is convinced, by a careful examination of the patient and the state of the excretions, that no complication exists, either a common plunge bath, particularly in sea water, or the *shower-bath*, will often prove serviceable, especially when it is followed by a genial glow on the surface.

220. *h. Masked or anomalous ague* requires a nearly similar treatment to that already recommended. The decided and repeated use of cholagogue purgatives, both before, and alternately with, a liberal use of quinine, or other tonics, or of the *carbonate of iron*, especially when the complaint assumes a neuralgic character; change of air, and attention to the digestive and excreting functions, are the chief and most successful remedies. In the more painful or spasmodic forms of these affections much advantage will accrue from conjoining quinine with camphor and colchicum; neither these nor other stimulants or antispasmodics, impairing the sedative action of colchicum, in as far as regards pain. In some cases of this kind I have given the chlorate of potash, in the decoction of bark, and the infusion of valerian, with camphor, and the ammoniated spirit of colchicum, with benefit. The *alkaline carbonates* in large doses, with energetic tonics; and the *kreosote* are also sometimes efficacious.

digestive and excreting organs must be restored,

221. *D. Treatment of the sequelæ.*—The treatment of agues should not terminate with the discontinuance of the paroxysms. The functions of the and the more severe consequences of the disease in the abdominal viscera removed; otherwise, a return of the fits will follow the slightest causes; or the obstructions in these viscera will induce very serious structural lesions. Certain of the complications are also among the most serious sequelæ of ague, especially diseases of the liver, mesenteric glands, large bowels, &c.; for these may both accompany and remain after the fever; or they may not be very manifest, although doubtless previously existing, until the fever has disappeared. This is not infrequently the case with dysentery and chronic diarrhœa, particularly in warm climates; and with dropsies in this country, which, however, are only contingent consequences of the disease. The treatment must mainly depend upon the nature of the consecutive affection, which, as respects the *liver*, commonly consists of enlargement, chronic inflammation, or both, with or without more or less obstruction of the portal circulation, or of the biliary secretion. In either case the means which have been recommended by Mr. **Annesley** and myself, viz. local depletions, followed by repeated blisters or setons; a full dose of calomel, taken occasionally at bed-time; the hydrargyrum cum creta or blue-pill the intervening nights; and mild purgatives early in the morning; will be found most beneficial. After these have been persisted in according to the nature of the case, and the more active symptoms have been entirely removed, this organ continuing torpid, the *nitro-muriatic acids* used both internally and externally, and exercise on horseback will be of service; but mercurials must have been relinquished some time before the use of the acids. Lastly, a course of Cheltenham or Harrowgate waters, or judicious substitutes for them, used daily and perseveringly, will confirm the recovery.

222. If enlargement of the *spleen* be present, or that of the *mesenteric glands* be inferred, frictions of the abdomen with warm stimulating liniments (F. 311.); stomachic purgatives, as rhubarb with sulphate of potash, and small doses of the sulphate of iron; the hydriodate of potash in moderate doses; and blisters, setons, moxas, &c. will be found most successful. In neither of these states of disease will depletions be required, unless pain and tenderness on pressure be complained of, when local depletions, followed by blisters or the turpentine epithem, will be sufficient. The most appropriate treatment in cases of consecutive *dysentery* and *dropsy* is fully described in these articles.

inflammatory form, or associated with active de-

223. *E. The Diet* during the intermissions should be light, nourishing, in very moderate quantity, and taken at a time not too close upon the accession of the paroxysm. If the disease be of an termination to an important viscus, *abstinence*, as directed by **Celsus**, **Senac**, **Tessier**, &c. should be observed. Whilst purgatives are being employed, broths and weak soups are most suitable. In the paroxysm, diluents only are admissible.

224. *F. During convalescence*, strict attention should be paid to the diet and regimen, and to the states of the digestive and excreting organs. The latter should be assisted occasionally, and always when they are sluggish, by the usual means; and quinine, the other preparations of bark, or different tonics, should be continued for some time after the disappearance of the paroxysms. Regular and moderate exercise, especially on horseback, also, will materially promote recovery. Exposure to cold easterly or northerly winds, or to the night air and moisture, ought to be carefully avoided; and if change of air cannot be enjoyed, or if the patient be still liable to be exposed to malaria, the *Prophylactic Measures* advised in the article **Endemic Influences** (§ 20.) should be adopted as far as circumstances will permit.

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See also the Bibliography to *Fever in general;* and Ploucquet's Repertorium, which contains a numerous list of foreign works, down to the commencement of this century, very few of which are here referred to.

XII. Remittent Fever. Syn. — *Exacerbating, Paroxysmal, Sub-continual, Endemic, Endemial, and Endemical, Fever*, of various writers.

225. Defin. — *The febrile phenomena evincing striking exacerbations and remissions, one paroxysm occurring in the twenty-four hours.*

226. This fever, although holding a middle rank between agues and continued fevers, approaches the former most nearly in its causes, phenomena, and consequences. It is most common in warm climates, and in the warmer countries without the tropics, in which it is most prevalent in summer and autumn. It is strictly a disease of locality and climate, and hence very generally denominated *endemic;* but as climates and localities vary remarkably, so is it modified in character from the mildest form, in which it is similar to simple ague in every respect but the complete remissions, to the more malignant states, in which it so nearly approaches yellow fever in warm countries and seasons, and continued fever in temperate climates, as to have been frequently confounded with them. To intertropical practitioners, especially, as well as to those in temperate countries which abound with the endemic causes of disease, this fever presents great interest. It is not infrequent in the vicinity of London; and in marshy localities in the southern counties of England, and Ireland, during the summer and autumnal months.

227. i. Causes.—The *predisposing* and *exciting causes* have been noticed above (§ 194.), and more especially in the articles Disease (§ 31. 55.) and Endemic Influences. Dr. Chambers has supposed that remittents arise from two principal sources: — 1st, from marsh-miasmata; 2dly, from sudden vicissitudes of atmospherical temperature precipitating some other deleterious principle evolved from hidden sources. — Of this latter, however, we can have little or no knowledge; and, even granting the evolution of such a principle, we have no evidence of any sources from which it can arise different from those pointed out in the articles now referred to. As, therefore, the exciting causes of endemic fevers in *adults* are chiefly emanations from the soil — from decaying organic bodies on its surface or commingled with it — and from stagnant putrid water; and, as these causes are necessarily varied in concentration, activity, and in their nature, according to the states of the air, and to the varying proportions of vegetable and animal matters undergoing decay, so it must be inferred that the effects produced by them, even when the constitution of the recipients is the same, will be also varied: but, when we consider the great variety of habit, organisation, temperament, and susceptibility, it must necessarily be concluded that the forms and states of fevers resulting from

these causes must be still more remarkably diversified, and will vary, not merely in type, from a simple tertian, through the remittent forms, to a purely continued state; but also as to vascular action, vital manifestation, and visceral complication. Remittents, therefore, and as observation has repeatedly proved, are merely severer grades of the same pathological states as constitute intermittents; a more concentrated form, or intense action of the exciting causes which produce the latter, either absolutely or relatively to the predisposition or susceptibility of the individual, also occasioning the former. That concentration of the exciting causes, or intensity of action, is, in some measure, concerned in creating the difference, is shown in the constant residents of an unhealthy locality having ague at one season, when the exhalations are rationally inferred to be neither abundant nor intense; and remittents at another, when these causes are either the one or the other. That the state of the recipient has a marked influence, is proved by persons recently arrived in districts productive of endemic fevers having some one of the forms of remittent at the same time and place as those who have been long resident have ague. Remittents are most prevalent in autumn, next so in summer, and the least so in spring. They rarely occur in winter, in temperate countries, unless in those which nearly approach the tropics.

228. ii. Description, &c.—From the varying forms remittents assume, owing to the circumstances just mentioned, it is evident that all *divisions* of them must be purely conventional, and founded on degrees of severity, and on alterations of their most prominent features. M. **Beaumes** has distinguished them into three grades — the *severe*, the *less severe*, and the *benign*; and M. **Boisseau** into the *inflammatory*, the *bilious*, the *mucous*, the *adynamic*, and the *ataxic*. The three last of these are merely modifications of the adynamic, as respects the state of vital power and vascular action. I shall adopt a nearly similar arrangement to that which I have stated above (§ 44.)

229. *A. Mild remittent* appears after slight ailments of several days' duration; the precursory symptoms being chiefly uneasiness at the epigastrium, lassitude, and pains in the back, limbs, and head, with restlessness at night. These may continue for some time; the *formative period*, or the time elapsing from the impression of the cause to the *invasion* or developement of the febrile phenomena varying from five or six to about thirty days, as determining or accessory circumstances may arise to accelerate or reinforce the action of the chief cause. The stage of *invasion* is similar to that already described; it being attended by coldness of the surface, and frequently by shivering. The coldness is soon superseded by heat, by febrile flushes, or by alternations of heat and cold, by nausea, and occasionally by vomiting, which soon develope the stage of *excitement*. With it, the pains of the head, back, and limbs become remarkably aggravated; the mouth is clammy and dry; the tongue white or loaded; the surface very hot and parched; the face flushed; the features tumid; and the pain of the head attended by a feeling of distension and throbbing, often passing into delirium. The pulse, which, at the invasion, was small, irregular, and weak, is now full, large, strong, and frequent; thirst is urgent; the bowels constipated; and the urine scanty and high-coloured. There is always more or less tenderness at the epigastrium, with nausea, and often with vomiting. These symptoms generally continue from about ten or twelve to eighteen hours, when perspiration breaks out; the pulse falls in frequency and strength; the irritability of the stomach subsides; delirium disappears; and the skin becomes cooler: but there is merely a remission or abatement, but no intermission, of the febrile symptoms. The remission usually continues from three to nine or ten hours, when an exacerbation occurs, sometimes preceded by chills or shiverings, at other times not, and the severer symptoms are renewed. Thus the disease proceeds with alternate remissions and exacerbations, the former generally taking place in the morning, until the seventh day, or the ninth, eleventh, or fourteenth day, or much later, in temperate countries, when a copious perspiration generally puts a termination to its progress. This form of fever has a particular disposition, as Dr. **Jackson** has remarked, to a favourable critical change on the seventh, fourteenth, twenty-first, and twenty-eighth days; but in warm countries it seldom continues longer than fourteen days.

230. *B.* The *inflammatory form* frequently attacks sanguine plethoric Europeans residing in warm miasmatous climates. It differs from the foregoing chiefly in grade, and the greater degree of vascular reaction in the period of excitement, which is sometimes so great as to exhaust the tone of the vessels and the powers of life, and even to change the blood, thereby simulating some forms of epidemic or continued fevers, especially when the remissions become obscure, as is often observed in the worst cases. It commences either as the foregoing, or with rigors, pain and sickness at stomach, and oppression at the præcordia, followed by vomiting, headach, great dejection of spirits, and mental delusions of a low or gloomy kind, sometimes impelling the patient to suicide, which, in two instances, I have seen attempted even before much complaint had been made. In other cases, the patient falls down in a state of syncope, following several days of indisposition, with a cold pale surface, and dejected countenance. The pain of the stomach and head increase, is attended with vomiting, sometimes of bilious matters, at other times of a whitish fluid, with fulness and tenderness at the epigastrium. The vomiting is generally followed by vascular reaction: the pulse, from being small, weak, irregular, or intermitting, becomes full, strong, and very quick; the face injected and tumid; the eyes prominent, watery, and red; the thirst intense; the throat arid and sore; the tongue furred, its edges red; and the headach and delirium increased. In about twelve or fourteen hours a copious perspiration breaks out, the symptoms subside, and the pulse falls to about ninety. After a short remission, the thirst, pain at the stomach, headach, &c. are aggravated, and the delirium and vomiting return. If the disease be neglected at the beginning, the remissions disappear, the skin becomes dry and caustic, or moist and clammy; the pulse small and irregular; the tongue black and crusted, and the vomiting, pain at the epigastrium, &c. more

constant. In the most severe and unfavourable cases, yellowishness of the skin, or vomiting of matters like coffee-grounds, or both, occasionally supervene. The bowels, which, before the attack and at its commencement, were torpid, are, at further advanced stages, irritable; the evacuations being watery, greenish, and, at last, almost black; the urine being very scanty and high coloured. If the disease be not actively treated at the commencement, an unfavourable termination takes place between the third and seventh days; but it is often prolonged beyond this period, and it then generally occasions visceral disease.

231. Such is the inflammatory remittent of warm climates. A nearly similar fever attacks unseasoned Europeans lately arrived in the West Indies and intertropical Africa, and often presents an obscurely remittent or almost continued type. It has been very generally mistaken for true yellow fever, owing to the malignant symptoms it assumes at an advanced period, or state of exhaustion consequent upon the vascular excitement of the early stage. The inflammatory remittent, the bilious inflammatory, the adynamic or malignant remittent, and the ardent or seasoning fevers of Europeans lately arrived in warm countries, are merely modifications of each other, and differ essentially from epidemic yellow fever, with which, however, they have been all most singularly confounded.

232. *C. Bilio-inflammatory remittent fever* differs but little from the foregoing in its characters and course. It is most prevalent in Europeans who have not resided long in a warm miasmatous country, and in low marshy localities, or in thickly wooded districts. In temperate climates, it is observed chiefly in the autumns consequent upon very warm summers; and in the bilious or bilio-sanguineous constitutions. It is often dependent upon the vicissitudes of season, especially wet seasons following great warmth, or a very hot summer consequent upon a wet spring; and it is often very prevalent or almost epidemic during the hot months, after very heavy rains, within the tropics. Violent determination to the brain characterises the commencement of reaction, in this variety; and inordinate affection of the liver and digestive mucous surface, the more advanced stages. Pain in the head is most severe, especially in the forehead and sockets of the eyes; the conjunctiva is yellow or suffused; the countenance and skin become dusky or yellow; the tongue is loaded by a bilious coating; and the evacuations are bilious; especially the matters thrown off the stomach. The bowels are at first costive, but they afterwards often become irritable or dysenterically affected. After the vomiting has continued some time, the appearance of the matters is changed, and ultimately assumes in fatal cases the characters just described (§ 229.).

233. *D.* The *adynamic or malignant remittent* is one of the severest and most fatal of endemic fevers. — *a.* It is observed only in places where the endemic causes are concentrated or intense relatively to the state of predisposition; and is seldom ushered in by shiverings, but generally by a prolonged sense of cold, universal collapse of the vital powers, and of vascular action. Pain in the head of a peculiar constrictive kind; mental depression and insane delusions; imperfect efforts at reaction; remarkable lassitude and pain in the loins and limbs, are present at the commencement, with great anxiety, pain, and oppression of the præcordia, and nausea, sometimes giving rise to vomiting, which assists in developing the stage of excitement, and in partly overcoming the internal congestions. The pulse is small, constricted, or irregular; the skin becomes dry and caustic, or moist and clammy; and impresses the hand of the observer with an acrid or tingling sensation; the eyes are watery and injected; the tongue is clammy, moist, or flabby and coated, and afterwards dry, rough or brown; the face is flushed, but dusky or purplish: the bowels are costive, subsequently relaxed or irritable, and the urine is scanty, high coloured, or suppressed. After twelve or fourteen hours, a slight remission is observed, after which the symptoms are exacerbated; the stomach is remarkably irritable; the epigastrium painful and tumid; the breathing hurried; and the patient restless and distressed. In the more dangerous cases, hiccup, constant vomitings, yellowish discolourations of the skin, exudations of blood from the digestive mucous surfaces, low delirium, and death, supervene between the fourth and seventh days.

234. *b.* This variety is variously *modified,* in different circumstances and persons. It sometimes assumes more of a *cerebral or typhoid character;* at others, it is *bilious or gastric,* according to peculiarity of season or concentration of the cause. In some intertropical countries it becomes epidemic, or rather this endemic is more than usually prevalent. Occasionally the remissions are indistinct from the commencement, and they generally become so after three or four days. — *α.* In some cases the vascular excitement is at first more or less intense, with remarkable determination to the head, liver, and stomach, and maniacal delirium, the disease very nearly approaching the inflammatory, or bilio-inflammatory forms. — *β.* In others, vascular reaction is very low and imperfect; the pulse small and quick; the abdomen tumid and hot, whilst the extremities are cold or clammy; the evacuations foul, morbid, and offensive; the tongue fuliginous; the gums, spongy, or oozing a bloody sanies; the vomiting constant, and ultimately grumous and dark; the stools towards the close, black or pitchy; the urine scanty or nearly suppressed; the solids flaccid; and the skin earthy or discoloured. In both these states, a yellowness of the surface occasionally presents itself about the third or fourth day, beginning in the conjunctiva, neck, and breast. The yellowness often passes to a pale greenish hue, in patches, shortly before death; and the soft solids present a liquescent state, having lost their vital cohesion.

235. *c.* In other cases of this form, the symptoms are at first mild, and the excitement inconsiderable; when, after two, three, or four exacerbations, the powers of life appear suddenly exhausted; the pulse becomes weak and fluttering; the tongue foul, black, and dry; the evacuations offensive; the prostration of strength extreme; and the fætor of the perspiration remarkable. At last, great anxiety; tenderness and tension of the epigastrium; fulness of the hypochondria; collapsed features; a squalid or yellowish surface; vomiting of dark or grumous matters, supervene, and indicate the utmost

danger. This insidious modification of the adynamic form generally occurs in persons highly predisposed, or who have suffered from bowel complaints, or who are debilitated, and are subjected to the more concentrated effluvia.

236. *d.* In some instances the remittent commences in so mild a form, that the patient is even able to walk about his apartment; and, for several days, complains only of irregular exacerbations of fever, when, suddenly, violent and malignant febrile action supervenes, which rapidly exhausts vital power, and either quickly carries off the patient, or induces serious structural change in several of the abdominal organs. In other cases, vascular excitement is hardly manifest at any period of the disease, the exacerbations consisting merely of increased anxiety, restlessness, general distress, and mental depression, occasionally with augmented sickness; and pain in the head, epigastrium, and loins; the pulse being but little accelerated until the close, and the temperature, unless at the epigastrium, rather under than above natural. In these, however, the weak, soft and open or irregular pulse; the dark-coated, or soft, flabby, and lobulated tongue; and the blackish, greenish-brown, and morbid excretions, in connection with the other symptoms, denote extreme danger. It would seem as if the causes had nearly annihilated the irritability of the moving fibre, and deprived the system of its ability of reacting upon, or superseding, the morbid condition induced by their first impression.

237. *E. Complicated remittents.*—Complications are observed in the inflammatory, bilio-inflammatory, and adynamic forms; the alterations that take place in the seats of predominant disease, being the chief causes of unfavourable terminations. The importance, therefore, of recognising them at an early period must be evident. — *a.* Amongst the earliest complications in remittents are *inflammatory states of the mucous surface of the stomach and duodenum.* This condition is indicated by constant irritability of stomach; by fulness, heat, and tenderness of the epigastrium; and by a foul loaded tongue, with red sides and apex. This pathological state often extends to *the small intestines*, and even to the *large bowels*, as indicated by tumefaction and tenderness of the abdomen; by a sense of inward soreness or heat; by irregularity of the bowels, or frequent, scanty, and morbid evacuations; and by diarrhœa or dysenteric symptoms. If the *large bowels* be chiefly affected, the dysenteric symptoms are more urgent; and on examination soreness or tenderness will often be complained of in the region of the cæcum and course of the colon. Remittents thus associated often pass into, or terminate with, dysentery. The *gastric complication* is frequently induced by the irruption of an acrid bile at the commencement of the fever; the morbid state of this secretion irritating and inflaming the parts over which it passes. The *intestinal affection* probably arises from the same cause, or from accumulations of mucous sordes or other morbid matters in the bowels. But collections of acrid and morbid secretions and of fæcal matters most frequently occasion the *dysenteric disorder*; and a morbid state of the bile frequently contributes its aid also in producing this complication.

238. *b. Disease of the liver* is a common complication of remittents, especially in the East Indies and in warm climates; and even in this country. In most cases of this fever, the functions of the liver are disordered; but actual structural change is also common; and may appear early in the disease, or at later periods. The biliary secretion is most frequently increased; in a few cases it is diminished; and in some it is accumulated in the ducts and gall-bladder for a time, and is afterwards let loose, increasing the disorder of the stomach and bowels. But, whether in excess or diminished, it always is more or less changed in quality. The structural affections of the liver attending remittents are nearly the same that are met with in agues, excepting that inflammatory action, acute congestion, or moderate determination, affects its internal structure more frequently in the former than the latter, and the vascular action partakes more of the asthenic character. With congestion and inflammation, more or less enlargement also exists; and occasionally puriform matter is formed; but the latter is seldom evinced by diagnostic symptoms; signs of diseased structure of the viscus being only apparent. Even when horripilations or rigors do occur, they are liable to be mistaken for the cold stage of the paroxysm. *Softening* of the internal structure of the liver, with or without congestion or enlargement, is a common lesion in the adynamic states of this fever. I have observed it most frequently after fulness, tenderness, a sense of burning, or pain in the right hypochondrium and epigastrium, with great anxiety, intense thirst; dark-coloured and loaded tongue, very quick and weak pulse; offensive evacuations, and dark grumous vomiting. *Disease of the spleen* is a common complication in old European residenters in hot climates, and in many localities in the south of Europe. It is similar in kind to that already noticed. In the low forms of remittent complicated with disease of the liver or spleen, the greatest care should be observed to avoid roughness in the examination of the abdomen and hypochondria. Too great or sudden pressure has produced irreparable injury in such cases.

239. *c. Determination to the brain* of an active kind, rather than pure inflammation, often occurs early in the more severe remittents. In the most prominent of this class of cases, the symptoms of cerebral excitement, and increased vascular action in the brain, are superseded by stupor, coma, low delirium, and typhoid or adynamic symptoms. The peculiar delirium, insane delusions, and mental depression or apprehension, which often affects the patient from the commencement, seems to be less the result of inflammatory action in the brain, than of impaired nervous and cerebral power. It often passes off, or it changes into a state of apathy or indifference to the result of the disease, and strong disinclination to take the medicines prescribed. This effect upon the spirits and mental powers evidently arises from the peculiar or specific action of marsh poison, which, as I know well from experience, occasions a distressing feeling of depression and despondency, even when it does not induce open disease. Maniacal excitement or delirium often passes into coma or stupor, and the patient expires as if in a quiet sleep.

240. *d.* The association of remittents with *pulmonary affections* is observed in temperate countries, especially in the spring and summer; and

more rarely in warm climates. The pulmonary functions are more or less impaired during the formative and invading periods; but acute disorder is seldom developed until the period of excitement, and consists chiefly of *bronchitis, catarrh,* and *pneumonia,* of a nervous or congestive form. In some cases *congestion* of the lungs, and of the bronchial surface, commences during or shortly before the period of invasion; and either partially continues throughout the disease, or passes into a low form of inflammatory action, and even into hepatisation. *Rheumatism* is also occasionally complicated with remittents; and *erysipelas* sometimes supervenes when a part is injured, the cuticle abraded, or the skin divided. *Ulcers* and *sores* not unfrequently take place on the lower extremities in the course of remittents, as well as of intermittents, particularly in low, wooded and swampy districts within the tropics.

241. *F. The terminations of remittents* are — 1st, In restoration of the healthy functions; — 2d, In a chronic form of remittent; — 3d, In organic change of one or several important viscera, particularly of those which manifest predominant disease during the progress of the fever; — 4th, In fever of a different type; — 5th, In dysentery; — and, 6th, In death. Although any of the *consequences* pointed out above (§ 47. 189.) may arise, changes of the viscera of the abdominal cavity are by much the most common, in this class of fevers, as well as in agues. The PROGNOSIS is apparent from what has been advanced, and in every respect agrees with what has been stated on the subject above (§ 57. *et seq.*).

242. *G. The lesions observed after death* from remittents, as respects both their seat and nature, differ but little from those already described in connection with agues. They, however, are of that kind which are generally observed to result from acute action in connection with deficient power. The *liver* is usually injected, remarkably softened, of a dark colour, friable, and sometimes enlarged. The *spleen* is often so soft as hardly to admit of being handled. The *digestive mucous surface* is softened, injected, ecchymosed, of a dark due, and sometimes thickened, abraded, or even ulcerated in the lower parts of the canal. The *mesenteric glands* occasionally, and the *pancreas* more rarely, are enlarged or otherwise changed. The *bronchial lining* is generally dark, injected, and soft. The *lungs* are sometimes congested, infiltrated, condensed, or inflamed. The *pleura* and *pericardium* often contain some dark sanguineous serum; and the substance of the *heart* is frequently soft, flaccid, and readily torn, the cavities being occasionally dilated, more especially after the adynamic states of the disease. Adhesions between the pleuræ are rare. The changes *within the cranium* consist chiefly of congestion of the veins of the pia mater and sinuses, with a fluid dark blood; and sometimes of effusion of serum into the ventricles, and between the membranes. But the lesions of the encephalon are seldom very great, or in relation to the severity of the cerebral symptoms during life.

243. iii. DIAGNOSIS.—It might be supposed that the remissions would be a sufficient characteristic of this fever, and they certainly are so as respects the remitting type. But the occasional occurrence of yellowness of the skin, and of black vomit, in the advanced stages of its more intense forms, has been the means of confounding it with two other species of fever, in which also yellowness of the skin and black vomitings occur — the *bilio-inflammatory* or *ardent fever,* which attacks only new comers to an intertropical country, especially America and Africa — and the *true infectious yellow fever,* which sometimes spreads in a most pestilential form. The more intense and adynamic forms of remittent, the bilio-inflammatory, or ardent seasoning fever of Europeans recently arrived in a hot climate, and the true yellow fever arise from different causes, and present different phenomena at their commencement and early course, although the character of the symptoms often approximates in their last stages.

a. 244. As respects the *intense and adynamic states of marsh remittent,* it has been shown above that the exacerbations seldom continue above fourteen or eighteen hours, so that one takes place daily, varying however, in intensity, so that they thus usually present a quotidian or double tertian type; but in the *bilio-inflammatory,* or *ardent seasoning fever* of Europeans, the type is continued, or a remission does not occur till after thirty or thirty-six hours, a different train of symptoms then usually appearing. These two fevers arise from different causes; — the *remittent* always proceeds from malaria in some form; hence it is common to all warm countries, and to temperate regions in warm seasons, and varies remarkably in severity; *the bilio-inflammatory* or *ardent fever* may probably also arise from the same cause, but it is more especially the effect of temperature upon European constitutions, or of atmospheric vicissitudes and other causes acting concurrently with these; hence the much greater uniformity of its character, in which it nearly approximates to the bilio-inflammatory form of the remittent. Whilst remittents can, in every instance, be traced to terrestrial exhalations — to the sources described in the article ENDEMIC INFLUENCES, ardent fever often appears where the operation of such causes has been impossible, and where I have endeavoured in vain to account for its occurrence, excepting in the way stated hereafter.

245. *b.* These two diseases are *the seasoning fevers of Europeans arrived in a hot climate* — ardent fever commonly appearing in robust plethoric persons who have emigrated to the West Indies, intertropical Africa, &c.; the intense forms of remittent, in those less robust, or who have not been attacked by ardent fever, and who have been exposed to malaria after their arrival. This statement is illustrated by the following facts which came under my own observation in 1817 and 1818: — Some young men arrived from Europe in a place within the tropics, during the healthy season, and where no sources of malaria then existed. They soon were attacked by the common ardent fever, with two or three exceptions, and recovered by means of the treatment advised for this disease; but during the unhealthy season, several of them had remittent fever; and those who had not been attacked by the ardent seasoning, had the more severe forms of remittent, which was their seasoning. In the East Indies, the inflammatory forms of remittent are the most frequent fevers in recently arrived Europeans; but in the West Indies, ardent fever is the most common, especially in the young, plethoric, or robust — in those much exposed to the sun's rays, who use great

exertion, and live freely or intemperately, who neglect their bowels, or check the perspiration. — In the latter, the yellow skin, and vomitings of dark matters are most frequent, and appear earlier than in the intense forms of remittent, and both diseases, although distinct, have been denominated yellow fever, from the contingent appearance of a single symptom, towards their close, and have thereby been confounded not only with each other, but also with another fever distinct from both, and merely because one *or* at most two symptoms are common to all three, but only in the last stage of the most unfavourable cases.

246. *c. The true or pestilential yellow fever* is different from severe remittents and from ardent fever, *neither of which is infectious*, whilst *true yellow fever is eminently infectious.* — *α. Ardent fever* occurs only in Europeans recently arrived in hot climates, and never in the acclimated, nor in aboriginal or native inhabitants: it cannot attack the dark-skinned races, and the assimilated European. — *β.* The *severe forms of remittent* affect both those who have recently arrived in miasmatous districts after they have been exposed to endemic causes, and those who have resided longer, and become seasoned or acclimated, especially when the causes have been concentrated or intense. They may also attack individuals from adjoining districts, especially from elevated situations, when they descend to the low grounds, and swamps near the sea, or the embouchures of rivers; but they rarely affect the aboriginal inhabitant, and the negro races. — *γ.* The *true yellow fever*, on the other hand, attacks the unseasoned, the seasoned, the constant resident, and the dark-skinned races — the negro as well as the European — all within the sphere of its infection *who have not previously had the disease.* A former attack protects from true yellow fever; but remittents will occur again and again in the same person; and even ardent fever will occur a second time, if the person who has once been affected by it has returned to Europe, resided long in it, and afterwards gone to a warm country; although on this second visit, the fever will much more probably be an inflammatory remittent, than the ardent or bilio-inflammatory disease. The remittent is endemic in warm climates, and in several temperate countries in warm seasons, especially those abounding with the sources of malaria; the ardent fever occurs only among persons who have recently arrived from cold or temperate climates, into a very hot country; and true yellow fever appears only occasionally, and then the infection may either extend to a few only, the circumstances favouring its diffusion not existing, or to great numbers, the disease thereby becoming epidemic. Thus the first and second of these fevers are always occurring, especially the first; the third, seldom, or after long intervals.

247. The confusion which has thus arisen from confounding three diseases so essentially distinct has been perpetuated by published works and in official returns. Thus a practitioner observes fever in the West Indies among sailors or soldiers lately arrived; and has to treat, although the locality is healthy, a number of cases of ardent fever, with high action at the commencement, and, in some of the most unfavourable of these, with yellowness of the skin, black vomit, &c. in the last stage. He finds large depletions cure the disease; and notwithstanding his range of observation is confined, and the symptoms referred to contingent, he publishes, to inform all whom it may concern, that he has had numerous cases of yellow fever to treat, that he cured nearly all of them by large bloodlettings, and that the disease was neither contagious nor infectious; all which was very true, with the single exception of the disease being yellow fever, the ardent or bilio-inflammatory, arising from very different causes, having been mistaken for it; and very probably a case of true yellow fever had never come within the sphere of his observation during his residence in the country; or if it has appeared, it has been mistaken for the disease now instanced, or for a severe remittent; or indeed all three may have been confounded together, as most commonly is the case. — A second practitioner arrives in a part of the country where the intense or concentrated states of remittent are endemic, and where it presents the inflammatory, or bilio-inflammatory form, in persons more recently arrived from Europe, and where also yellowness of the skin, &c. occasionally appear in the last stage. He finds that bleeding kills as many as it cures when indiscriminately and incautiously employed, and has therefore recourse to mercurials, especially calomel, observing that, when salivation occurs, the patient is generally safe. He also believes that he has had yellow fever to treat, that it is the endemic of the country, and not infectious, and that mercury given to produce salivation and not bleeding is the cure for it. He writes to convert those who entertain different opinions from himself, and thinks that no one else knows anything of the matter. The same errors are committed in this case as in the former, excepting that another disease has been mistaken for yellow fever, although that malady has either never been seen by him, or has been confounded with the endemic of the country. — A third practitioner has enjoyed a more extensive range of observation: he has observed not only both these diseases, but a third also; he has recognised the origin of the three in very different causes; has noticed marked distinctions between them, in their early stages especially; has ascertained the infectious nature and the only occasional occurrence of one of them, to which the name of yellow fever is most applicable; he has watched the beginning, progress, and devastating spread of this malignant disease; and he has experienced the inefficacy of treatment in its most severe cases. These important facts and many others connected with the subject are placed before the public, but are controverted by the first and second practitioners, and those who, having observed, like them, in one confined circle, and during a period of no great duration, have, notwithstanding, become instructors of others; and who, wanting the experience of those whom they oppose, have not even inspiration to plead either in behalf of their doctrines, or as an apology for their intrusion. Thus the inexperienced are bewildered by contrariety of opinions, or misled by partial views which do not apply to the circumstances and diseases which often will present themselves. It will, therefore, be better for him, who has to treat for the first time the fevers thus generally confounded with each other, to apply himself to the task with a mind well instructed in pathological principles and

with a due knowledge of disease and of therapeutical agents, but perfectly unbiassed by doctrine or by the reputed efficacy of certain modes of treatment; otherwise, he may find out, after some untoward experience, that neither the doctrine, nor the practice founded on it, applies to the cases which he is called upon to treat. I never shall forget with what bitterness an amiable physician many years ago told me, on my meeting him in an unhealthy climate within the tropics, where he had arrived some months before myself, of his want of success in treating the fevers of the country. Being desirous of the guidance of those who had written on the disease, he had treated it at first conformably with the instructions given in books, and the first nine cases terminated fatally in rapid succession. The practitioner should observe and think for himself; and whilst his mind is open to the suggestions which works will furnish, he should ascertain the states of vital power, and of local and general morbid action, in each case, and employ medicinal agents appropriately to these, and with promptitude and decision, guided but not weakened by caution.

248. iv. Treatment. — *A. Of the mild remittent.* The treatment of this form differs not materially from that advised above for agues, especially when the remissions are distinct. At the commencement, before reaction is developed, and when there are no indications to forbid their exhibition, *emetics* are generally of great benefit. After their full operation, a large dose of *calomel*, or of calomel and opium, may be given, and an action produced on the bowels by *purgatives* and cathartic enemata. These means having been repeated until morbid secretions and fæcal accumulations are evacuated, bark or quinine may be prescribed, if the remissions are distinct, and the patient not removed from the unwholesome locality. But in cases where the previous health and long residence of the patient in an unhealthy climate do not forbid it, moderate *bleeding* in the stage of excitement will shorten the disease, and render the remissions more perfect. During reaction in the early exacerbations, repeated doses of *James's powder* with calomel, or the *tartarised antimony* given in solution every hour or two, or every half hour, in full doses, commencing it in the cold stage, so as to produce vomiting, and continuing it in this manner throughout the subsequent reaction, will frequently accelerate a favourable termination; and render large vascular depletion less necessary. In old residents in warm climates, or in those constantly living in an unhealthy situation, this medicine will often supersede bloodletting, if the bowels are early and freely evacuated. In the mild autumnal remittent, also, of this climate, a similar treatment is appropriate; bleeding being required chiefly in the young, robust, and plethoric. Subsequently, refrigerants, cooling diaphoretics, and other appropriate means may be employed.

249. *B.* In the *Inflammatory and Bilio-Inflammatory Forms* the practice, early in the disease, should be energetic.—*a.* In the cold stage, or that of invasion, and when, although there may be most severe headach, the heat of the scalp and the action of the carotids indicate that it is not inflammatory nor dependent upon fulness of blood; and when excessive vascular action in the stomach and liver has not yet been developed, an active *emetic* is of essential service. As soon as the stage of excitement is developed, and proportionately to its excess, and to the degree in which vascular action becomes predominant in the head, liver, or stomach, should *bloodletting*, generally or locally, or both, be practised; the quantity having relation to the constitution, habit of body, &c. of the patient. In order, however, that depletion may be productive of benefit, it must be practised early in the disease; for if deferred till the excitement has partly exhausted the powers of the system, its good effects cannot then be obtained; the nature of the pathological states admitting of *local depletions* only, which, however, should be employed in order to remove such local congestions as may have taken place.

250. *b.* Full doses of *calomel*, followed by purgatives (F. 181. 216. 266.) and cathartic enemata (F. 140, 141. 150.) are also early requisite; the first of these having been given soon after the operation of the emetic, and combined with James's powder. During the vascular excitement, particularly when the skin is very hot and dry, the cerebral symptoms strongly marked, and the abdominal viscera free from congestions, *cold applications* should be kept to the head, and the *cold affusion* frequently resorted to. When vital power is much impaired by the impression of the exciting causes, or exhausted by the previous excitement, and when the abdominal viscera are congested, as evinced by the fulness and tenderness of the hypochondria and epigastrium, the cold affusion is a hazardous measure, the constitutional powers not being always sufficient to bear the shock, and the overloaded viscera sometimes suffering further from the external impression. In such circumstances, especially when the pulse is quick and irritable and the skin harsh, the *tepid bath*, and sponging the surface with cold or tepid water, will be preferable. A certain degree of vital power is necessary to a successful application of the cold affusion; the surface being hot and dry, and the internal viscera not seriously congested.

251. *c.* When the *head* is much affected, *leeches* to the temples, behind the ears, and to the occiput, or cupping, will be serviceable; evaporating lotions, or the cold affusion on the scalp being resorted to: but even these may be injurious if employed too late, or in states of exhaustion. The appearance of the face and eyes, the heat of the scalp, the expression of the countenance, and the action of the carotids should guide the practitioner, and not the degree of delirium or of insane delusion; for these may be most remarkable where vascular action in the brain is lowest, as they depend more upon nervous and cerebral power than upon vascular action. When much heat, pain, tenderness, and fulness of the *epigastrium* or *hypochondria*, with nausea and vomiting, are present; the matters thrown up being viscid or ropy and abundant, and yellow, green, or yellowish green, or dark green, or colourless and mixed with albuminous flakes, energetic vascular depletion should be early resorted to, otherwise the vital tone of the mucous coat and capillaries of the stomach will be soon exhausted, and dark grumous vomiting supervene. In these cases, a large bloodletting from the arm, and twenty grains of calomel, with two or three of opium, should be promptly prescribed. If these be fol-

lowed by marked mitigation of the symptoms and a copious perspiration, this latter should be encouraged by cooling diaphoretics; but if the symptoms continue or return, either a repetition of these remedies, or a large depletion near the seat of the chief disorder, ought to be directed. A large *blister* should be afterwards applied, or the warm *turpentine epithem*. The latter is preferable, inasmuch as its effect is almost immediate, as it excites a copious perspiration, and as it may be renewed from time to time with additional benefit. *Purgatives* may now be given, and they will generally be retained; but those which are least irritating to the stomach should be selected, and their action promoted by cathartic enemata. In the intervals, the liquor ammoniæ acetatis, with camphor mixture and nitrate of potash, may be prescribed, or other cooling diaphoretics.

252. *d.* If *the bile* be secreted in great quantity and acrid quality, the consequences of the active determination to the liver occasioning this disorder, and the effects of the morbid secretion upon the digestive mucous surface, ought equally to be guarded against, by local depletions, by external derivatives, cooling diluents and demulcents, and by aperient injections. If symptoms of inflammatory action in *the liver* are manifest, the same measures should be promptly and energetically employed. If the *bowels* be inordinately affected, a similar treatment is necessary; the external rubefacients being applied over the abdomen; and a large dose of calomel and opium should immediately follow the depletions. All these ought to be repeated according to circumstances; emollient and laxative medicines being exhibited by the mouth and in enemata, and cooling diaphoretics in the intervals. When soreness, tension, or fulness of the bowels continues notwithstanding, the external applications (§ 251.) should be repeated. If with fulness of the abdomen, there is much load on the tongue, and oppression at the epigastrium, purgatives, especially in enemata, should be persisted in.

253. *e.* The *exhaustion* of the advanced stages, produced by the previous excitement and by the treatment, demands attention. If the above means have removed all local disease along with the morbid excitement, and if the patient is beyond the influence of the causes, little more is necessary, as the system soon rallies. But if he be constantly subjected to them, the consequent exhaustion will be thereby increased, or its character modified, and the adynamic condition superinduced. In such cases, suitable means are devised with great difficulty. If the exhaustion be attended by a distinct remission, the pulse falling in frequency, and the tongue remaining moist, the irritability of the stomach having subsided, the exhibition of bark or quinine should not be delayed; for by it chiefly are we to hope to prevent an accession of the febrile action, and to preserve the powers of life from the noxious influence of the surrounding causes. But the effect of this substance should be carefully watched: as long, however, as the tongue is dry or rough, with the papillæ erect, the pulse hard or irritable, and the skin hot and harsh, the remains or unfavourable consequences of the previous morbid action are still unsubdued; and these the exhibition of bark would increase. In this case, local depletions, tepid or warm bathing, purgatives, diaphoretics, and external rubefacients are still required. If the symptoms and circumstances of the case warrant the use of bark, the decoction with the subcarbonate of soda and nitrate of potash, or with the liquor ammoniæ acetatis and muriate of ammonia, may be first employed, and subsequently the more active preparations of this substance; but, during its exhibition, the secretions and excretions must be promoted by purgatives with mercurials, &c. The decoction may be given for this purpose with the neutral purgative salts, or quinine with either of the sulphates, so as to keep the bowels freely open. If calomel has been freely given at the beginning, and the bowels well evacuated in the progress of the disease, blue pill, with the aloes and myrrh pill, and ipecacuanha, may be taken at night, and the bark or quinine in the day. It is chiefly in cases where depletions and purgatives have been too long delayed, or insufficiently prescribed, and where the latter have been laid aside too soon, that the bark either fails, or occasions congestion, or obstruction or consecutive inflammation of any of the abdominal viscera.

254. *C. The adynamic states* of remittent fever, occurring primarily, or supervening secondarily upon either of the other forms, are the scourges of intertropical countries; and present such a variety of characters in both hemispheres — the yellowness of the skin and dark grumous vomiting, predominating in the western hemisphere (the *yellow remittent fever* of Dr. CHISHOLM) — that methods of cure which shall be appropriate to their varying forms are often devised with as great difficulty as with want of success. In every condition, however, the removal of morbid secretions and accumulations from the prima via is a necessary preliminary. At the period of invasion, the sense of cold being prolonged, and the nausea not attended by free vomiting, and more especially if the formative stage be characterised by dysenteric symptoms, as sometimes observed in hot climates, the exhibition of an *emetic* will be useful. — *a.* In the more malignant states of this form, in which the stage of excitement commences with tumultuous vascular reaction concentrated chiefly in the viscera of the large cavities, and principally those of the abdomen, *bloodletting*, either general or local, or both, should be practised early in this stage, especially in persons of a robust, plethoric, and sanguine constitution; for, if this state of reaction be not speedily moderated, the vital tone of the viscera which chiefly experience it is soon exhausted, and collapse of the vital powers, with organic change and yellowish discolouration of the skin, supervenes as early as the third, fourth, fifth, or sixth days, in unfavourable cases, and later in those which are less so, followed soon after by dark, grumous vomitings, and all the symptoms to which the term malignant may be appropriately given. Emetics are beneficial only in the formative and invading stages of these cases, and are hurtful if administered in the irritated and inflamed states of the stomach and liver generally attending reaction. After free depletion, from ten to twenty grains of calomel should be exhibited, with one or two of opium, and be repeated according to the effect and the circumstances of the case. If the first bleeding has been insufficient, a second should be directed within twelve

or eighteen hours, and followed by the calomel and opium; and the bowels ought to be freely opened. In the worst forms of marsh fever, particularly in hot climates, the secretions of the liver are often interrupted or suppressed, large doses of calomel and active purgatives being especially required in them. If the mouth become affected, the circumstance is favourable, although we should hardly make this a specific indication unless other intentions be also fulfilled. The warm bath, followed by frictions of the surface, or by the terebinthinated epithem on the abdomen, and by diaphoretics, will also be of great service.

255. *b.* Whilst vascular depletions are thus necessary in the more concentrated and inflammatory states, which rapidly pass into the adynamic or malignant form, they are inapplicable to those in which the powers of the system are insufficient to produce vascular reaction; at least, they should never be employed until efforts at reaction are made, when a small or moderate general or local bleeding may be directed, especially after the warm or *vapour bath* and frictions of the surface, with the view of relieving the overloaded vessels of the large viscera, and of removing congestion of the venous trunks and auricles of the heart. If an adynamic state has continued from the commencement, the skin of the trunk being harsh and dry, the extremities damp, the pulse weak and rapid or irregular, the tongue dark and coated, the bowels disordered or costive, and the evacuations morbid, the vital energies of the frame should be roused by means of the hot or vapour bath; by assiduous frictions with stimulating liniments (F. 299, 300. 311.); and internal congestions removed by warm diaphoretics, stimulants, purgatives, and mustard poultices, or the hot turpentine epithem applied over the epigastrium and hypochondria, and, in extreme cases, on the insides of the thighs also. In this latter class of cases, calomel is still indicated, especially if the stomach be irritable; but it should be conjoined with large doses of either camphor, ammonia, or capsicum, with opium. Subsequently, the bowels having been very freely evacuated, and the states of the tongue, of the pulse, and of the skin not forbidding, bark in decoction, or sulphate of quinine, may be prescribed.

256. *c.* A similar treatment is indicated when an adynamic or malignant state supervenes on that of low excitement — when the skin becomes yellowish or dusky, and the irritability of the stomach urgent or disposed to pass into the dark grumous vomitings, indicating great danger. This affection of the stomach is much more violent when it is consequent upon excitement than when supervening in the course of a fever in which excitement has been imperfectly expressed; for, in the former case, the vital power of the organ is exhausted, and the organisation affected; in the latter, power is simply diminished or suppressed, restoration being more easy in it than in the former. In both circumstances, the external derivatives just mentioned, and calomel in the combinations specified, are chiefly to be relied upon. When the vomiting consists of a pumping up of the contents of the stomach, rather than of active retchings, cordial stimulants should be employed in addition to these; and aromatic spices, ammonia, ether, camphor, opium, &c., may be variously combined. Fluids evolving carbonic acid, as spruce beer, seltzer-water, soda-water, bottled stout, &c., may also be prescribed. In a few urgent cases, I have found from half an ounce to an ounce of the spirits of turpentine, taken on the surface of milk or any aromatic water, with half a drachm of magnesia, allay the irritability of the stomach, lower the pulse, and render the tongue moist, after other measures had failed; and I have exhibited this dose, or F. 216., as a purgative, three or four hours after a bolus consisting of ten or fifteen grains of camphor and calomel, with one, two, or three of opium, had been taken; promoting the action of the bowels by warm cathartic enemata, if necessary.

257. *d.* In low, miasmatous districts, bark or quinine, in suitable combinations, is often necessary in an advanced stage of the adynamic states. The former in substance, however, or the latter in large doses, generally irritates the stomach, and it then proves injurious. The infusion of bark, therefore, with the chlorate of potash, or with muriatic acid or ether; or the decoction with muriate of ammonia, or with nitrate of potash, and the solution of the acetate of ammonia; should be first employed; and subsequently, the quinine with acids. But while we thus endeavour to support vital power, morbid secretions and fæcal collections should be fully evacuated, either by mild purgative draughts, — and preferably by those of a stomachic or tonic kind, — or by enemata, or by both. If the combination of the mild preparations of bark with the antiseptics and refrigerants just instanced are inefficacious, the more energetic preparations with ether, or the preparation of ammonia, or with aromatics, &c. must be resorted to.

258. *D. The complicated states* must be treated with reference chiefly to the condition in which vascular action and vital power are manifested. The treatment of the more inflammatory complications has been already described; and those of the more adynamic states are so diversified, that the measures already recommended, as well as others about to be noticed, must be adapted to individual circumstances. If an irritable or dysenteric state of the bowels occur, morbid secretions or fæcal accumulations have probably caused irritation of the mucous coat. A full dose of calomel should therefore be given, if it have been neglected, and be followed by a common purging draught, by castor oil, or F. 181. 216. 266.; and, in a few hours, laxative enemata, and demulcents should also be administered. After the full operation of these, anodynes, with gentle alteratives and light tonics, or the preparations of bark or quinine in the forms above mentioned, may be exhibited. In the adynamic states, this complication is very unfavourable, especially when the stools are very dark, black, or otherwise morbid; and the abdomen swollen and painful. Calomel, with camphor and opium, is necessary in such; and large blisters, or the other external applications previously directed (§ 251.), are especially indicated. Tonic purgatives, &c. are also requisite; and bark or quinine in large doses, and in forms of combination most appropriate to this particular class of cases. The other complications either have been already noticed, or demand no material modification of the treatment. Whether seated in the head, thorax, or abdomen, the state

of vascular action, in connection with vital power, requires attention; local depletions, external derivatives and revulsants, active purgatives and diaphoretics, with diuretics, constituting the chief means of cure.

259. *E. A treatment has been strongly recommended by* Dr. Stevens for the advanced stages, and malignant or adynamic forms, of remittent and other fevers; but I am not aware that it has been satisfactorily or properly employed by other practitioners. One of the substances, at least, — the *chlorate*, or *oxymuriate of potash*, — I have often prescribed as a tonic and stimulant, and for a great many years, both at the infirmary for children, and in private practice; and I am quite convinced, from an extensive experience of its effects in low states of fever, of its very beneficial effects. It has often a remarkable and rapid effect upon the state of the tongue, rendering it more moist and clean. Dr. Stevens states that, when adynamic symptoms appear, after venesection, mercurials, cold affusion, and purgatives have been prescribed, no time should be lost in exhibiting non-purgative saline medicines, especially the carbonate of soda, the chlorate of potash, and common salt; and that these should be repeated every hour during the disease. These substances he believes to act beneficially upon the constitution of the circulating fluids, and to replace that portion of the saline constituents of the blood, which he supposes to be lost or changed in the early course of the disease.

260. *F. If the remissions become hardly distinguishable,* the states of morbid action being in other respects as above treated of, the method of cure must still be the same as recommended for the inflammatory, bilious, concentrated, and adynamic or malignant forms respectively; the nature of the disease being no further changed by *the continued type thus assumed*, than that the constitution suffers more decidedly, and the vital powers sink more rapidly under the unremitting state of disease induced. Hence the means of cure should be the same in kind, but administered, in warm climates especially, with greater promptitude and decision.

261. *G. Where remittents assume the intermittent type,* as they occasionally do in unhealthy localities, the liver, spleen, or mesenteric glands, or all of them, are more or less disordered, or actually diseased; and enlargement or obstruction of one or more of them generally soon afterwards becomes evident. In cases of this kind, although the active exhibition of bark or quinine is necessary to prevent the return of the paroxysms, which, by their continuance, would increase the mischief, yet the full operation of purgatives and deobstruent laxatives is equally requisite; for, without them, neither will the obstructions already existing be removed, nor the intermittent disease be safely arrested, nor the bark or quinine exhibited with permanent advantage to the patient. In cases of this kind, change of air is next in importance to the employment of suitable medical treatment; and, in all cases, the one should accompany the other. If *remittents pass into dysentery*, disease of the liver, and of the mesenteric glands, with the other changes in the large bowels, fully described in that article is a common pathological state; and the treatment must be directed accordingly, and as fully detailed under the above head. The *regimen* and *convalescence* of the patient, and the means proper for the *prevention of relapses*, differ in no respect from what has been stated on these topics under the treatment of intermittents (§ 223, 224.).

XIII. Chronic or Obscure Remittent. Syn. — *Anomalous or relapsing Remittent; Slight Nervous Fever*, I. Macculloch.

262. Charact. — *Slight febrile exacerbations and remissions, with headach, &c.; recurring in daily, occasionally in reduplicating, paroxysms; continuing for an indefinite period, and giving rise to various disorders of the digestive organs and nervous system.*

263. This very slight form of remitting fever often continues a very long time when its nature is mistaken. It is by no means an infrequent disease: three or four instances of it have been treated by me very lately; and before my attention was directed to it by the writings of Dr. Macculloch, other cases had disappointed my anticipations as to their nature and treatment. It appears in delicate persons, and commonly arises from the less energetic action of the same causes which produce the more decided and acute forms of marsh fever, and generally in a primary mode; but it also may follow the simple remittent described above. It bears the same relation to the definite and severe disease, as the slight, anomalous, or masked intermittent does to regular ague. When it is so marked as to be esteemed a fever, it is often mistaken for hectic; and in its slighter modes it is confounded with what is commonly called debility, chronic debility, chronic dyspepsia, delicate health, nervousness, low spirits, hypochondriasis.

264. *A.* In the cases which have occurred to me, exposure to *malaria* was manifest; and to two patients the *cause* was assigned and explained, and a different residence recommended. Whether it may arise from other sources, is not determined; but I entirely agree with Dr. Macculloch in believing that malaria is far oftener present than has been imagined, more especially during late years, and around the metropolis. In those cases which have been traced to this source, the whole character of the disorder is that of remittents, as shown by its tendency to critical periods, and its diurnal remission, &c. It often, also, terminates in an intermittent as slight and obscure as the original disease; while it is not infrequently followed by local affection of the nervous system, especially periodical headach, toothach, intermitting rheumatism, and neuralgic pains. Its frequent recurrence or relapses, especially during north-east or easterly winds, and in the outskirts of the metropolis, thereby resembling anomalous or masked ague, is also a circumstance deserving of remark, and an argument for considering it, with Dr. Macculloch, as a modification of remittent, and as the effect of a slighter dose or different conditions of the marsh poison. By mistaking this fever for other diseases, the sufferings of the patient are often materially aggravated; whilst, having recognised its nature and cause, not only the means of cure, but also those of prevention become obvious. In many cases the cure and prevention are accidentally hit upon either by the practitioner or patient; and the state of ill health complained of removed by change of air, or a visit to a watering-place.

265. *B. The symptoms* consist chiefly of great muscular weakness, which often appears unaccountable, of sinking sensations, and disinclination to exertion. A slight chill is often present in the forenoon, or about midday, or a creeping cold down the spine. During the afternoon, evening, and night, a slight degree of febrile excitement is manifest, and the palms of the hands become hot or burning. The tongue is generally white, and the apex and edges are often somewhat red. The urine is often pale and abundant in the morning, and higher coloured, and more frequently voided, in the evening and night. The patient is sometimes unable to follow his occupations in the morning; he wakens unrefreshed, either from a feverish, restless, or disturbed sleep, or from a lethargic, dreamy, and prolonged sleep; he is fatigued all morning, without knowing wherefore; is depressed, anxious, and irritable; or complains of want of mental energy or ability, and of dull headach; and, as the chills and sinkings of this period pass into a gentle febrile excitement, he feels more restored in the afternoon or evening. In the case of a delicate, most talented, and accomplished female, subject to this disease, and liable to relapses of it during cold easterly winds, although the most distressing, sinking, and exhaustion were often felt in the morning, so that she was hardly able to dress herself, or to get up to breakfast; yet she often could in the evening exert and enjoy herself. The pulse is occasionally not materially disturbed: it is frequently accelerated and a little hard, in the course of the exacerbations, but is commonly weak and slow in the remissions. The bowels are generally sluggish; the evacuations slightly disordered; and the appetite, when the heat is considerable, and the exacerbations very marked, is much diminished, and generally capricious. The patient loses flesh during the attacks, and various anomalous symptoms referrible to the stomach, bowels, and other abdominal viscera, often present themselves; and, when they become prominent, are liable to be considered and treated as the original complaint.

266. In many cases, although these ailments are both real and distressing, the patient is considered as either feigning, or hypochondriacal. In these more especially, and when the course of the complaint is less regular, the time of the day when the exacerbations and remissions occur, varies much. If they are tolerably regular, they often present a quotidian, tertian, or double tertian character, the symptoms being worse on alternate days. In the more chronic cases, the mind becomes irritable or despondent, and in some instances this latter feeling is most distressing. Dr. Elliotson confirms the remark of Dr. Macculloch, that the exacerbations are often unobserved from occurring in the night; increased heat, oppression of the head, and depression of spirits, amounting to hypochondriasis, being the chief symptoms. The nights are frequently the periods of greatest suffering. A gentleman, who consulted me in the summer of 1834, described them as being most distressing. In another case, an inability to think, with confusion of ideas, was complained of; an inflammatory dyspepsia, a burning sensation at the stomach, and other symptoms of irritation of the digestive mucous surface; sponginess of the gums, and soreness of the tongue, which often becomes smooth and divested of its papillæ, occasionally appear in the advanced course of the disease; and ultimately serious disorder of the abdominal organs, prostration of organic nervous power, and a state of ill health, amounting to general disease, supervene.

267. In some instances, this complaint assumes more of the intermittent character, and at different times it seems to vacillate between the remittent and intermittent types; but there is rarely any distinct cold stage or a greater feeling of cold than that above mentioned (§ 265.), excepting at the commencement of an attack, or of a relapse. Signs of functional disorder of the liver, and of torpid function of the colon, often appear, especially in this class of cases; and the disease is frequently considered a form of liver complaint; the heavy or dull headach sometimes attending it being imputed either to the same source, or to the accompanying affection of the stomach.

268. In conclusion, Dr. Macculloch describes this form of remittent as modified chiefly in degree and duration, it being often so slight as to require some attention in tracing its form, and even its existence. It is apt to become habitual, or to recur at frequent but variable intervals, during even an indefinite course of many years; varying in such a course its characters and symptoms, and being in some cases a marked chronic intermittent, in others remittent, and in some so brief and imperfect in its remissions as to be almost continued. Its accessions are of the ordinary duration of remittents, and they commonly observe the quotidian or double tertian periods. It is, moreover, often a primary disease: sometimes it is consequent upon ague, or the severe states of remittent, or even upon continued fever; and, whilst it is especially caused by malaria, in some of the slighter modes of this poison, it may possibly arise from other sources; or, after a first attack, a relapse may be caused by cold, moisture, atmospheric vicissitudes, the use of cold or drastic purgatives, vicissitudes of temperature, intemperance, bloodletting, and excessive evacuations.

269. Treatment. — *a.* The slighter, primary, and more recent states of this complaint are removed by the sulphate of quinine, the preparations of bark combined appropriately to particular cases, by Fowler's solution of arsenic and change of air; the bowels being duly regulated by laxatives, or mild purgatives combined with bitter tonics (F. 266. 562. 572.) But the more chronic states, especially when the nervous system is much affected and the patient has become desponding and hypochondriacal, are treated with much less success. If it degenerate into confirmed hypochondriasis, the case is one of the most difficult that comes before the practitioner. In some instances an active exhibition of *sulphate* of *quinine* is of great benefit. Dr. Elliotson alludes to a case in which five grains were given three times a day without benefit; but the dose having been increased to ten grains, relief was procured. When signs of inflammatory irritation of the digestive canal exist, the decoction of bark should be first employed with the nitrate of potash, or with the muriate of ammonia; and if the tongue be flabby, and the gums spongy, as in the case above alluded to, the decoction may be given with muriatic acid, or with the nitro-muriatic, or with the *chlorate of potash.* The combination of

aloes, or the aloes and myrrh pill, with sulphate of quinine and inspissated ox-gall, will be found the most successful purgative: it proved so in one of the cases I lately treated. The *kreosote* was employed by me in another case, in conjunction with quinine, in doses of from one to four drops three times a day. The patient was much benefited, but went on the Continent soon afterwards.

269. *b. Early change to a dry and wholesome air*, whenever the patient's residence is at all in fault, is the chief part of the treatment. Without this, relapses will be frequent. Healthy watering-places, travelling, and the rest of the means directed in *hypochondriasis*, must be resorted to when the disease has proceeded so far as to be attended by despondency. *Sea-voyaging*, which generally proves so beneficial to persons recovering from the remittents of warm countries, is also very serviceable in this complaint. It is a much more safe mode of enjoying change of air than that too often adopted by patients of this kind; for many of them, preferring to travel on the Continent, are in numerous places and on many occasions much more exposed to the efficient cause of the disease than if they had remained in England. Indeed, the worst instances which I have seen, or of which I have heard, have been those who had experienced attacks of ague or of remittent fever in Italy and in warm countries; and, on their return to this country, had suffered from the slighter causes occurring in it, or from the east winds of spring, and then blamed the climate of England for a disease which, if not contracted, had at least its seeds sown, in the countries which have been objects not only of their preference, but of their eulogies.

XIV. REMITTENT OF CHILDREN. SYN.—*Infantile remittent Fever*, BUTTER; *Febris verminosa* of various authors; *Spurious Worm Fever*, MUSGRAVE; *Febris mucosa verminosa*, GOËLIS; *Hectica infantilis*, SAUVAGES; *Febris lenta*, HOFFMANN.

270. CHARACT.—*Exacerbations and remissions of fever in children, with loaded tongue, loss of appetite and flesh, unnatural evacuations, pains in the abdomen and head, and much irritability; generally chronic in its duration.*

271. i. REMOTE CAUSES.—This disease usually affects children from nine or ten months to twelve or thirteen years old. It was very generally imputed by writers in the three last centuries to worms, which are rather a complication than a cause of the complaint; but a complication of remarkable frequency on the Continent, particularly in the unhealthy localities where this affection is most common, and often misunderstood; both this complaint and worms in the prima via, being occasionally concomitant effects of one and the same cause, which has been very generally overlooked. The remarks of HOFFMANN, BAGLIVI, DE HAEN, BRERA, and GOËLIS, as to the influence of the latter disorder in causing the phenomena of infantile remittent, should, therefore, be considered merely as proofs of the frequency of this concomitancy; whilst our experience of the disease, in this country in particular, demonstrates its independent nature. Dr. MUSGRAVE, in his "*Essay on the Worm Fever*," was the first who distinctly stated this; but a nearly similar opinion had been given by Professor SINCLAIR, of Edinburgh, long previously, and had also been entertained by Dr. MUSGRAVE's contemporary, Dr. WILLIAM HUNTER. Dr. CLARK confirmed the statement of MUSGRAVE; and the subject was soon afterwards set at rest by the publication of Dr. BUTTER's work on the "*Infantile remittent Fever*."

272. Dr. BUTTER assigned debility of the digestive organs, errors in diet, accumulations of morbid matter on the prima via, and the peculiar irritability of childhood and proneness to fever, as the principal causes of the complaint. I believe it to be often caused by improper food, by collections of mucous sordes in the digestive canal, owing to a neglect of the bowels; and by too cold or thin clothing; in connection with debility of constitution, and morbid irritability of the frame. But, having observed it most commonly in situations evidently productive of humid exhalations; in low, cold, and moist localities; and after exposure to a cold air after rain, particularly at night or in the morning, or during easterly winds; I am led to infer that it arises most frequently from the same causes as produce other periodic fevers; namely, terrestrial exhalations, or miasmata, and that less intense or concentrated states of these exhalations, than are required to produce either agues or remittents in adults, will often occasion the latter in children.

273. ii. DESCRIPTION.—This complaint usually commences gradually; the bowels being irregular, generally costive, but sometimes relaxed or irritated. Febrile exacerbations, with drowsiness, occur in the course of the day and evening, the child often evincing little disorder during the remission, excepting a loaded tongue and peevishness. The pulse varies in frequency with the exacerbations, and ranges from 100, to 140. The appetite is variable. These are often the chief symptoms of several days, when the complaint becomes aggravated, and a distinct chill or rigor is sometimes observed; followed by vomiting, and a more violent paroxysm of fever, drowsiness, flushed cheeks, and shooting pains through the abdomen and head. The child constantly picks its lips, nose, and eyes; and even pushes substances up the nostrils; and occasionally stiffness of the neck, great sensibility of the general surface, and tenderness, in the course of the spine, are observed. After some time the, functions of the digestive canal are almost entirely destroyed, the ingesta being either thrown off unchanged, or passed undigested from the bowels. In older children, the evening or night exacerbations are often attended by delirium. In some instances, particularly in very young children, convulsions occur, and render the diagnosis a matter of difficulty, unless the patient be carefully observed during the remissions. Such is the most common form this complaint assumes. Dr. BUTTER has, however, distinguished three varieties, which he has denominated the *acute*, the *slow*, and the *low*. There are some grounds for this division; or, rather, the complaint presents numerous modifications, which may be arranged under these or similar heads.

274. *A. The acute variety* is generally preceded by symptoms of indisposition, but it may occur rather suddenly. The bowels are irregular — commonly costive; the evacuations are morbid and offensive, the urine turbid, pale, or milky; and the tongue is loaded, especially at

the root. Fever supervenes, and is ushered in by cold, rigors, or chills; the child being hot and restless at night. The febrile exacerbations generally recur in the afternoon, and during the night; but there are often three fits, one also occurring in the forenoon; and, in the most severe cases, the remissions are very indistinct. During the *exacerbations*, the child is drowsy; and, if it sleeps, starting, moaning, and even screaming, or incoherence, are observed; sometimes with vomiting, flatulent distension of the abdomen, accelerated respiration, and cough. The pulse varies from 120 to 160, according to the age. The cheeks are usually flushed; the abdomen and palms of the hands being hotter than other parts of the body. Occasionally, the paroxysm terminates in a slight perspiration, which is often partial; the child falls into a quiet sleep, and the pulse sinks in frequency. During the *remissions* he picks his lips or nose; is irritable, and without appetite. The bowels are acted upon with difficulty; the evacuations are generally unnatural, but present no constant character; and worms are occasionally voided. The urine is now transparent, of an orange colour, and its quantity in relation to the fluids taken; and all the other symptoms noticed above are present in an aggravated form. As the disease declines, the exacerbations become mild and short, and often terminate in a gentle perspiration, with a sound or refreshing sleep; the urine deposits a sediment, and is pale; the appetite returns; and the stools assume a healthy aspect. But the pulse remains frequent, and the flesh and strength are regained very slowly, unless change to a mild dry air is adopted. If this form of the disease is either neglected, or improperly treated, or if the child remain in a moist or miasmatous situation, organic change, in some important organ, supervenes; or the complaint passes into the chronic form, hereafter to be described; or degenerates into marasmus from mesenteric disease. It usually terminates in from two to four weeks in the more favourable cases.

275. *B. The more adynamic variety*, or state of the complaint, is the least common; excepting in low, humid, and miasmatous situations. It is sometimes prevalent at the same season with the Choleric Fever of Infants (see this Article), evidently depends upon the same causes as it, and is a very closely allied complaint, differing from it merely in the type of the fever, and the degree in which the digestive canal is affected. This variety commonly begins more suddenly than the others; the earlier exacerbations being attended by the same symptoms as the preceding, but by greater affection of the head, and by delirium in the older children; and quickly passing into more or less exhaustion. When this change takes place, the child becomes quiet, or indifferent to external objects, and indisposed to the least exertion. He dozes, and is incoherent in the exacerbations; and, in the remissions, he lies in one position, constantly picking his face, particularly his lips and nose, until they become sore; or keeping his hands in continual motion. He usually, however, takes both food and drink, although sparingly. The countenance is anxious, pale, and unhealthy; the eyes reddish, especially the edges of the eyelids; the lips are covered with dark, ragged crusts, or exfoliations of their epithelium; the tongue and teeth are loaded with dark sordes; the bowels are much disordered — often irritable; and the stools are very offensive, watery, greenish, or otherwise morbid, and preceded by much griping and flatulence: both the stools and the urine are frequently passed involuntarily. When a favourable change takes place, the symptoms gradually subside; the voice, which was nearly lost, is regained or becomes stronger; the eyes are more lively; the tongue is cleaner, and the evacuations improve; the exacerbations being shorter, and the remissions more perfect and prolonged. This variety is generally more chronic than the preceding, but less so than the next. It usually continues from one to two months.

276. *C. The chronic form of remittent* in children either makes its approach gradually and insidiously, or follows the acute. The child wastes; the abdomen enlarges; the breath is offensive, and the strength fails. There is commonly only one exacerbation in the twenty-four hours, and it seldom appears before evening, lasting till morning, and terminating in sweats. The pulse is usually about 100 in the day, but rises to 140 in the evening. The tongue is white or loaded, but moist, and has often a strawberry appearance; the bowels are generally costive, and the stools always morbid. The child commonly keeps up, but is disinclined to move, or complains of aching in the limbs on exertion. There is little or no appetite or thirst; and the other phenomena characterising the complaint, in its common form, are present in various grades of severity. If the disease is not removed, tympanitic distension of the abdomen, emaciation, harsh discolouration of the skin, enlarged mesenteric glands, aphthous sores on the lips and tongue, chronic diarrhœa, and lientery supervene. When the disease declines, all the symptoms gradually amend; the nocturnal exacerbations abate; and convalescence is established after a period varying from two to four or five months.

277. This disease is generally sporadic, but is also sometimes epidemic. It is endemic in unhealthy localities; and many of the children born of European parents in hot or unhealthy climates are cut off by it before they reach their sixth or seventh year. When it occurs epidemically, it usually assumes the first or second of the above forms; and proves both more rapid in its course, and more dangerous, than in the ordinary states. — Dr. Sims, after describing the fevers prevalent in London in the years 1769 and 1770, which seemed chiefly to result from the endemic sources surrounding the metropolis and the state of the seasons, gives a very graphic account of this complaint, as it appeared epidemically during these years, and simultaneously with these fevers. As his description very nearly represents the disease as I have seen it in very low and miasmatous situations, I shall abridge it at this place. He remarks, that it was called by some a worm fever, though worms were seldom the cause; but as that apparently lay in the stomach and intestines, the error did not materially affect the practice. It was most common in children of a sallow complexion and thin habit, who had been over-fed, with the mistaken view of supporting and nourishing them. — The leading symptoms were, heat, thirst, quick, full pulse, vomiting, coma, and sometimes slight convulsions,

an universal soreness to the touch; a troublesome phlegmy cough, and great peevishness when not comatose. The fever was constantly of the remittent kind, the cheeks often appearing highly flushed, at other times pale. It lasted for several days, but seldom beyond a week; nor was the fatality attending it very considerable. Many of those who were seized by it had been subject for some time to symptoms which are thought to point out the existence of worms in the *primæ viæ*, as picking of the nose, grinding the teeth, starting out of sleep, swelling of the belly, white urine, short dry cough, &c.; yet worms scarcely ever appeared. These symptoms were evidently, as stated above, the early stage of the complaint — those described by Dr. SIMS its fully developed state.

278. iii. DIAGNOSIS. — This complaint is most liable to be mistaken for *hydrocephalus*, in its acute or subacute forms. Dr. PEMBERTON has pointed out the differences between them with tolerable accuracy. In the latter, there are occasional screamings in the sleep, tossings of the hands above the head, continual endeavour to thrust the head backwards, and an intolerance of light, with more or less strabismus. But in this fever there is seldom screaming or intolerance of light, and never strabismus; the hands being brought to the head merely to pick the lips and nose. In hydrocephalus the faculties are totally destroyed, and the patient cannot be roused to an exertion of sense, reason, or even of consciousness. But in the delirium of this fever, he can be at any time recalled to his senses, which he will often retain for a few minutes. In the former, food, or any thing given, however nauseous, will be taken; but in the latter, often neither food nor medicine is taken. The stools in this disease are more easily procured, more curdled, and contain more shreds of coagulable lymph than in hydrocephalus. Convulsions seldom occur, excepting at the commencement of the disease; or at its invasion; and when they disappear, the faculties are perfectly restored.

279. Dr. SIMS considers that there is the utmost difficulty in distinguishing between both these diseases, in children under five or six years of age, until hydrocephalus has proceeded to the second stage. There is much truth in this, especially where symptoms of cerebral irritation coexist with those of disease of the digestive mucous surface, in the infantile remittent, as is sometimes the case, and as I have several times observed. Yet, in most instances, this disease may be distinguished from hydrocephalus with considerable certainty: more particularly by the remissions; by the absence of distinct stages; by its prolonged course; by its affecting delicate, phlegmatic, and over-fed children; by the pains in the belly and head being indistinct, dull, or but little complained of; by the paleness of countenance and sluggishness of manner; by the heaviness and soundness of the sleep; by the perspirations after the exacerbations, and after eating and drinking; by the free state of the excretions, especially the urinary; and the comparative ease with which stools are procured; by the perfect condition of the senses, and tolerance of light; by the unceasing itching of the nose; by the rare occurrence of vomiting; by the little wasting of the body, and the fulness or flatulent state of the abdomen; by the absence of palsy of any part: by the constant peevishness; and by the absence of any expression of pain or distress of countenance. — (See also DROPSY *of the Head*, § 246.)

280. iv. TERMINATIONS AND PROGNOSIS. — The most common *termination* of this complaint is a return of the healthy functions; but, owing to original fault of constitution, to great debility, to the influence of an impure air, to improper diet, to injudicious treatment, and to neglect, obstruction and enlargement of the mesenteric glands, lienteric diarrhœa, chronic hydrocephalus, and tubercular disease of the lungs may supervene. The *prognosis* is, however, favourable when the child comes early under treatment; and more especially if the symptoms subside, and the remissions are prolonged and distinct. An unfavourable prognosis should be formed only when the disease is not benefited by the use of suitable remedies; when the exacerbations become severe, more frequent, or prolonged; when the abdomen is tense and swollen; and when indications of any of the organic diseases just mentioned appear.

281. v. The NATURE of infantile remittent fever may be inferred from the causes producing it, the circumstances in which it appears, and the early or premonitory symptoms. These indicate impaired organic nervous power, and imperfect performance of the functions actuated by the organic nervous system. Most recent writers have imputed this complaint either to derangement of the digestive canal, or to a depraved condition of the secretions of this part — which amounts to the same thing. The French pathologists view it as symptomatic of inflammation of the digestive mucous surface: but of the truth of this doctrine there is no conclusive evidence. *Post-mortem* appearances certainly lend it no support. The few instances in which I have observed them, presented chiefly enlargement of the mesenteric glands and of the spleen, with a few tubercles in the lungs. The digestive organs were not inflamed; but the intestines were distended by flatus, and their coats attenuated. Similar changes of the bowels and mesenteric glands have been remarked by HOFFMANN and PEMBERTON. From an extensive experience of this disease, I infer — *a*. That it proceeds from causes which impair the energy of the organic nervous system, and of the organs which this system more immediately actuates; — *b*. That, in consequence of this morbid condition, whether it arise from impure air, or proceed from unwholesome food, the excreting functions, particularly those of the digestive canal, are imperfectly performed; consequently mucous sordes, &c. accumulate on its internal surface, and become both a source of irritation and a nidus for the generation of worms; and hence the complication of this complaint with vermination occasionally takes place; — *c*. That the disease is frequently long in forming, preliminary changes being required, as in other fevers, to develope the more acute symptoms; — *d*. That it does not consist of inflammation, is shown by the character of its early symptoms; by its course, termination, and consequences; and by the *juvantia and lædentia*; — *e*. That it does not altogether arise from a depraved state of secretions of the digestive organs, nor from irritation of these organs, although these changes are very probably induced in its early course, is

proved by the facts that such depravation must itself proceed from anterior disorder, and that a treatment based solely upon the above doctrine is not generally successful; a free and healthy state of the alvine evacuations being often brought about without the complaint being removed; — *f*. That, in order to cure the complaint with the least delay and the greatest certainty, it is necessary to evacuate morbid secretions from the *prima via*, to impart energy to the organic nervous system, and to change the morbid states of the various related or dependent organs.

282. vi. TREATMENT.—*A*. The practice advised by MUSGRAVE, BUTTER, SIMS, PEMBERTON, and others, although furnishing valuable hints, is more or less defective; for, whoever trusts to it alone, or those whose resources extend no further, will occasionally find the disease by no means so easily managed as they expected, and will see it prolonged until the treatment is taken out of their hands, and, by the common sense of the parent, limited to change of air, and light nourishment; which, although amongst the most efficient remedies, have been very generally overlooked by writers. In all cases the treatment should be commenced with a moderate dose of *calomel* and *James's powder* at night, and a sufficient quantity of the bitter aperient mixture (F. 266.), or of *rhubarb* and sulphate of potash, or of rhubarb and magnesia, to act upon the bowels. If these are inefficient, an enema should be thrown up; and, from an experience of many hundred cases, I would recommend for this purpose equal quantities of castor oil and spirits of turpentine in water-gruel. At first, the above powder should be repeated every night, or on alternate nights, and the purgative in the morning, the injection being also employed every third or fourth day. At a more advanced stage of the treatment, and when the evacuations have improved, they may be prescribed less frequently. The choice of other means must depend upon the peculiar features of the case.

283. *B*. If the disease be of the form in which it usually presents itself (§ 273.), and the evacuations have been improved by the above means, an *infusion of cinchona*, or of *cascarilla*, or of *valerian*, with liquor ammoniæ acetatis, will be found of great service. If the bowels be still disordered and torpid, the *sulphate of quinine* may be given in a solution of any of the neutral sulphates; and the abdomen rubbed assiduously with a warm *stimulating liniment* (F. 311.), light nourishing diet, or a course of ass's milk, and change of air, being afterwards ordered.

284. *C*. If the complaint be of the acute form (§ 274.), and the child be plethoric and strong, a few *leeches* may be placed over the epigastrium at the commencement of the treatment, and afterwards a mustard poultice, or any *rubefacient epithem* may be applied; but the purgatives just mentioned, or similar medicines, should be prescribed; and the solution of acetate of ammonia with sweet almond emulsion, and camphor mixture, should be taken in the course of the day. After the more acute symptoms have abated, the infusion or decoction of *cinchona*, or the infusion of *cascarilla*, or of *calumba*, may be given with small doses of liquor potassæ, or of the muriate of ammonia, or the nitrate of potash, or with liquor ammoniæ acetatis, sweet spirits of nitre, &c.

285. *D*. When the disease assumes the adynamic state, above described (§ 275.), and when it has been of long standing, or considerable exhaustion has supervened, a further modification of the treatment is requisite. If the bowels have not been sufficiently evacuated, the above means should be employed for the purpose; and either the sulphate of quinine, or the preparations of bark, or of other tonics, especially cascarilla, ought to be taken during the remissions. In all the varieties of the complaint the remissions should be selected for the exhibition of bark, quinine, or other tonics, commencing at the subsidence of the exacerbation. In this state of the complaint, I have prescribed, for many years, the *chlorate of potash* in an infusion of *valerian*, or of *cinchona*, with great benefit, keeping the bowels moderately open, and directing the above liniment (F. 311.) to be rubbed along the spine, or over the abdomen.

286. *E*. When much pain is felt, and the belly becomes distended with flatus, the enema advised above should be administered; and either an anodyne fomentation applied to the abdomen, or the liniment rubbed upon it. MUSGRAVE recommends poultices, or *fomentations* with the warm decoction of *rue and aromatic herbs*. A decoction of chamomile flowers, poppy heads, and rue, in the form of fomentation; and a little spirit, or oil, of anise-seed, added to the medicine, will generally give relief. A warm bath at bed-time, or the semicupium, some salt, or mustard flower, or both, having been added to the water, will also be serviceable, especially in the low or advanced states of the complaint.

287. Dr. BUTTER placed much dependence upon the *extract of conium*, in doses of one grain in the day for every year that the patient was old, in conjunction with saline aperients. It is of little service of itself; but is often an useful adjunct to the medicines already advised, especially if the child be very peevish, the abdomen pained, or the bowels irritable. Dr. CHEYNE relied most upon calomel with antimony at bed-time, and the common purgatives, giving the former more frequently if the complaint seemed liable to pass into hydrocephalus. Dr. CLARKE and Dr. PEMBERTON insisted chiefly on tonic infusions, after the bowels were freely evacuated. These are generally serviceable in the circumstances and combinations pointed out, and the addition to them of the extract of conium is also beneficial. In some old cases, in which there was reason to suppose that, in connection with debility, there was some degree of obstruction of the mesenteric glands, I have given the *hydriodate of potash* internally, in small doses, with great advantage; but care should be taken not to prescribe it in doses large enough to irritate the stomach and bowels, otherwise it will increase the disorder.

288. *F*. The *regimen and diet* constitute a principal part of the treatment. Change of air, as early as possible, especially to a mild and dry air, and elevated situation, is always most serviceable. Warm clothing, frictions of the surface after the warm baths, and light but nourishing diet, are also very beneficial, particularly when convalescence has commenced. During the complaint, ass's milk, rusks, and weak broth, are suitable food. But, in the acute form, or at the commencement of the disease, even these may be

PROSPECTUS.

This work contains, in an abstract and condensed, yet comprehensive form, the opinions and practice of the most experienced writers, British and Foreign, so digested and wrought up with the results of the Author's practice, that the Student and Young Practitioner will not be bewildered in the diversity of the opinions and facts adduced for their instruction, but be guided in the difficult path on which they have entered, and enabled, with a due exercise of their powers of observation and discrimination, to arrive at just conclusions and successful practical results. To the experienced Practitioner, also, the work will present a diversified range of opinions, methods of cure, and authorities, which his matured judgment will enable him to apply in an appropriate manner to particular cases. It also comprises the complications and modified states of Disease, which are even more frequently met with in practice, than those specific forms too often described by Nosologists as constant and unvarying types, to which morbid actions, occurring under a great variety of circumstances, can never closely adhere. When discussing the methods of cure, the Author has attended to the various stages, states, and associations of disease, to the regimen of the patient, and to the management of convalescence. He has given prescriptions for the Medicines recommended, in the most efficient states of combination. He has also added, in an Appendix, and arranged in alphabetical order, upwards of a thousand Formulæ, selected from those most approved contained in the Pharmacopœias of various hospitals and foreign countries, and the writings of eminent practical Physicians, and from the notes of his own practice. The work, moreover, contains a full exposition of the general principles of Pathology; a minute description of the numerous organic lesions of the human body; and a detailed account of those states of disorder incidental to the sex, the different periods of life, and to particular climates, with the peculiarities resulting from temperament and habit of body. It is prefaced by a classification of Diseases according to pathological principles, and in natural order, commencing with the simplest and most limited states of functional disorder, advancing through the more extended and complicated diseases to those affecting the whole frame, and concluding with such as consist chiefly of morbid structure — the classification thus being a key to the systematic study of practical medicine, as well as an arranged contents of the work. In order to facilitate reference, as well as to avoid repetition, each article is methodically divided and headed, and the paragraphs numbered; and to each a copious Bibliography, with References, is added.

The Author having, since 1814, been in the habit of recording references to such medical works, memoirs, and subjects as he has found upon perusal deserving of notice, presents the accumulated results to the reader. He has excluded from his Bibliography all inferior productions, and nearly all inaugural dissertations; he has selected those works with whose character he is acquainted, and whose authors are distinguished; and he has brought down his record to the present day. He has likewise given copious references to such original papers and memoirs in the Transactions of societies, and in medical journals, as merit notice, believing them to constitute a most valuable part of medical literature and science.

In conclusion, the work contains the results of many years of laborious study and research, and upwards of twenty years' extensive and diversified experience, forming of itself a Library of Practical Medicine, and copious Digest of Medical Literature. It is printed in a small but clear type cast for the purpose, in the common 8vo size, and will be published in Five or Six Parts, the whole being confined within the compass of one large Volume, capable of being divided into two at the option of purchasers. It will be completed in the course of a few months.

Bulstrode Street, Cavendish Square,
April, 1835.

NOTICE.

I. Part IV. is in the Press, and will be published shortly.

II. The Preface, *with a Pathological Classification of Diseases, &c.*, forming a Key to the Systematic Study of Practical Medicine, as well as an arranged Table of Contents of the Work, will accompany the last Part.

III. An Index of the individual topics comprised under the various Chapters and Sections of each Article will also be given in the last Part.

IV. Although several Subjects usually treated of by names which come under the latter part of the Alphabet have been already considered, yet the Author cannot do justice to his task in less than Five or Six Parts.